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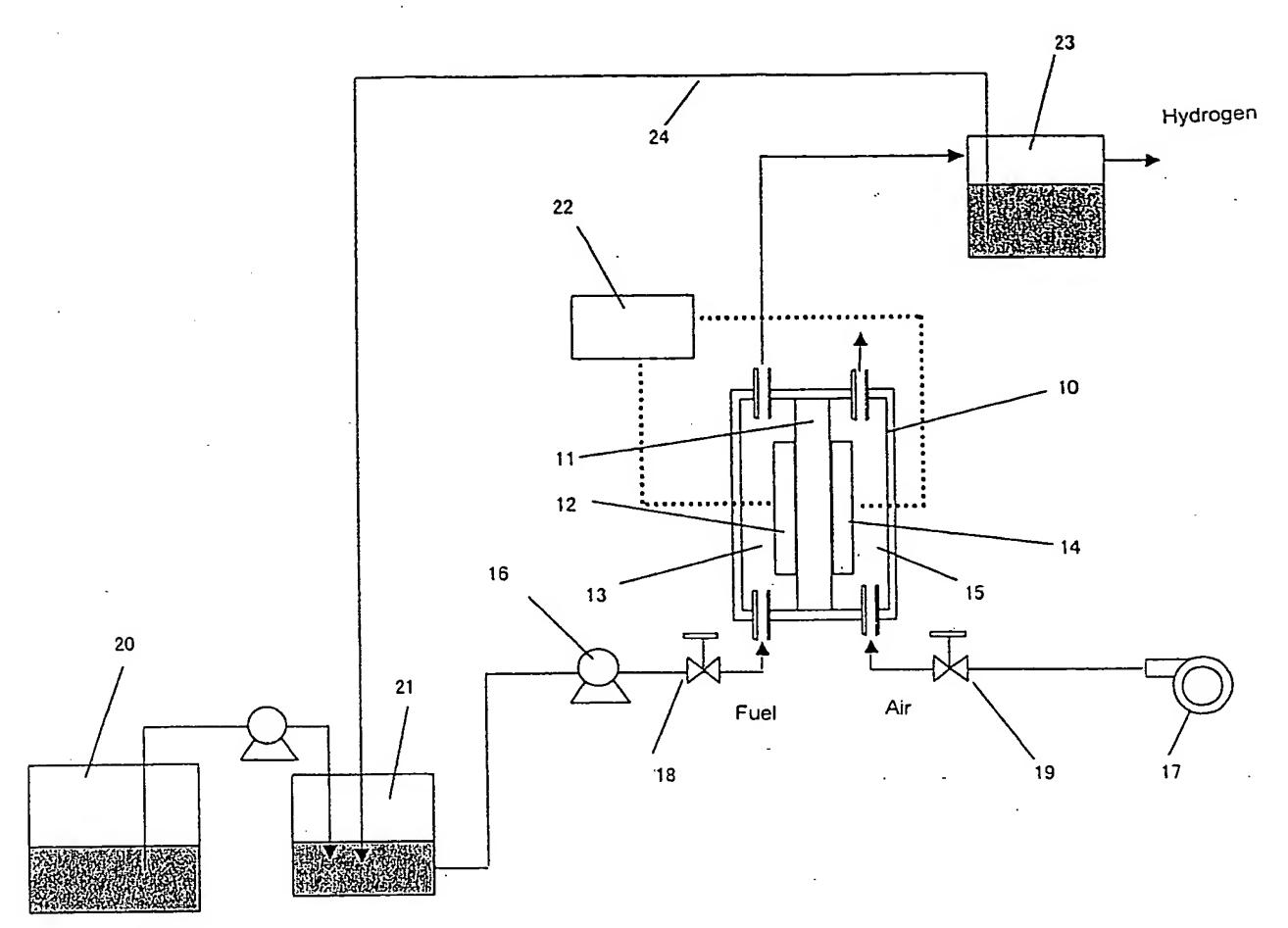
HYDROGEN BOOSTING MACHINE

HIGH-PRESSURE HYDROGEN STORAGE TANK

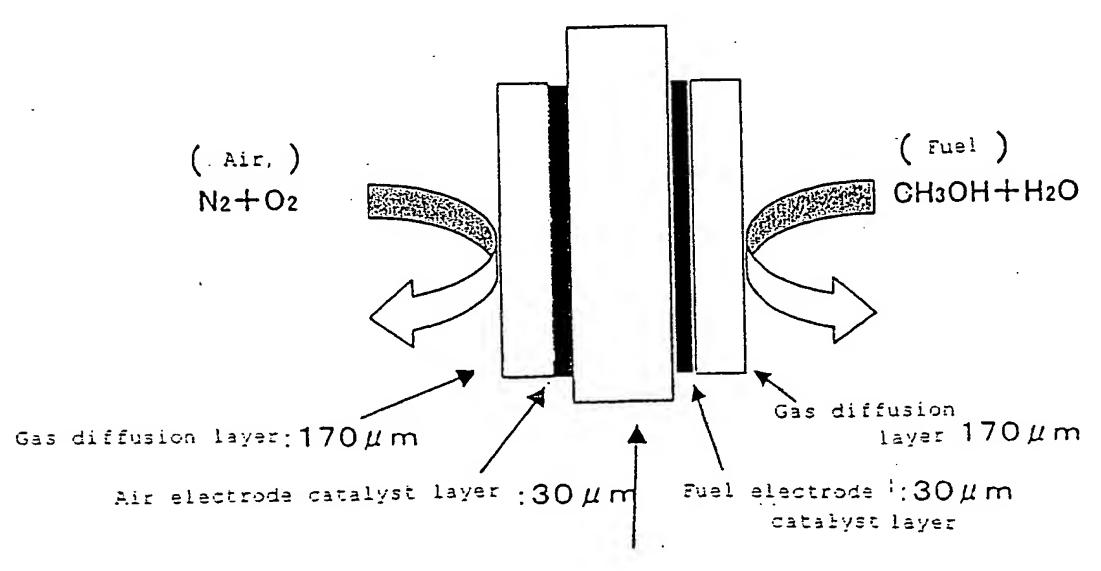
HYDROGEN DISPENSER

HYDROGEN STORAGE CONTAINER OF FUEL CELL AUTOMOBILE

### F I G. 1 (b)

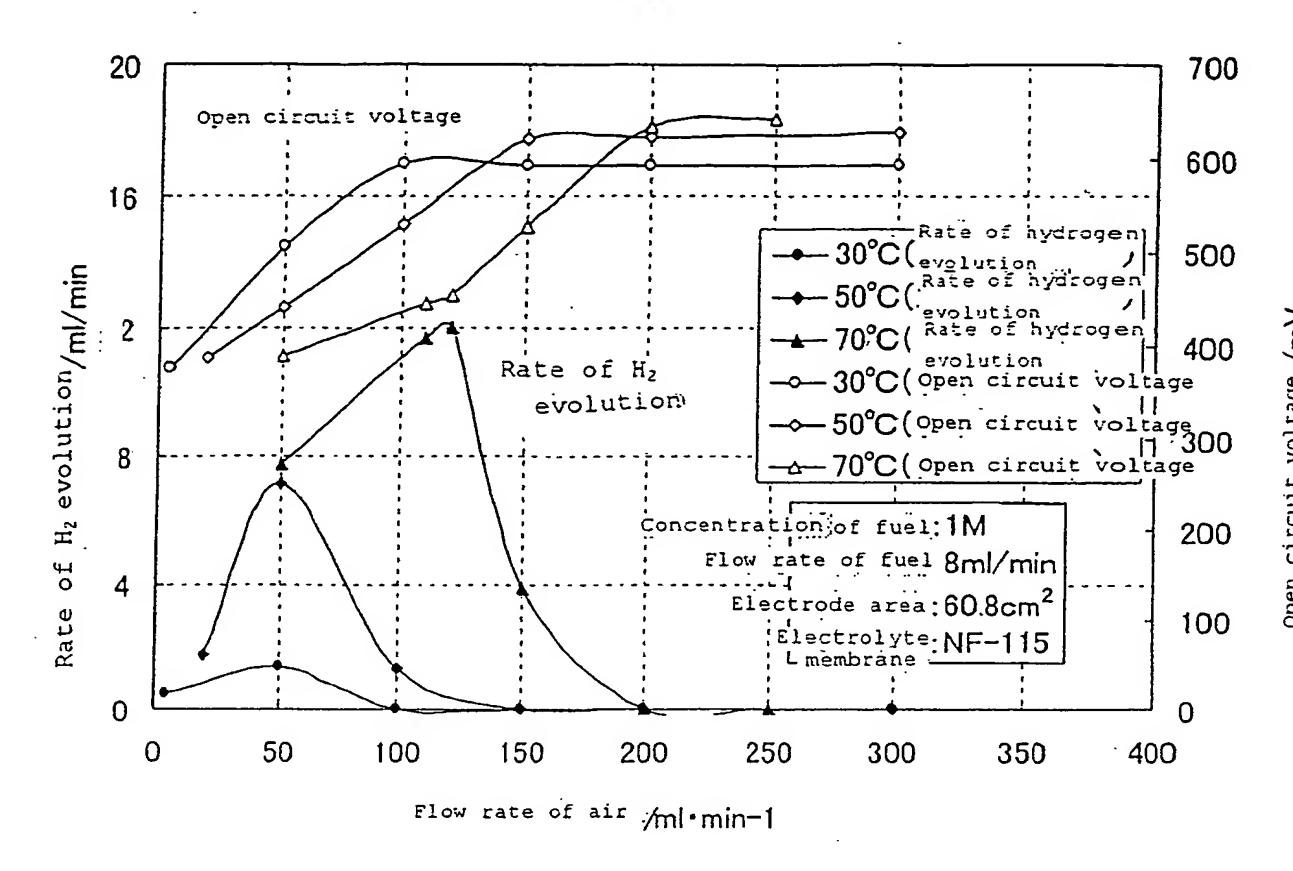


F I G. 2

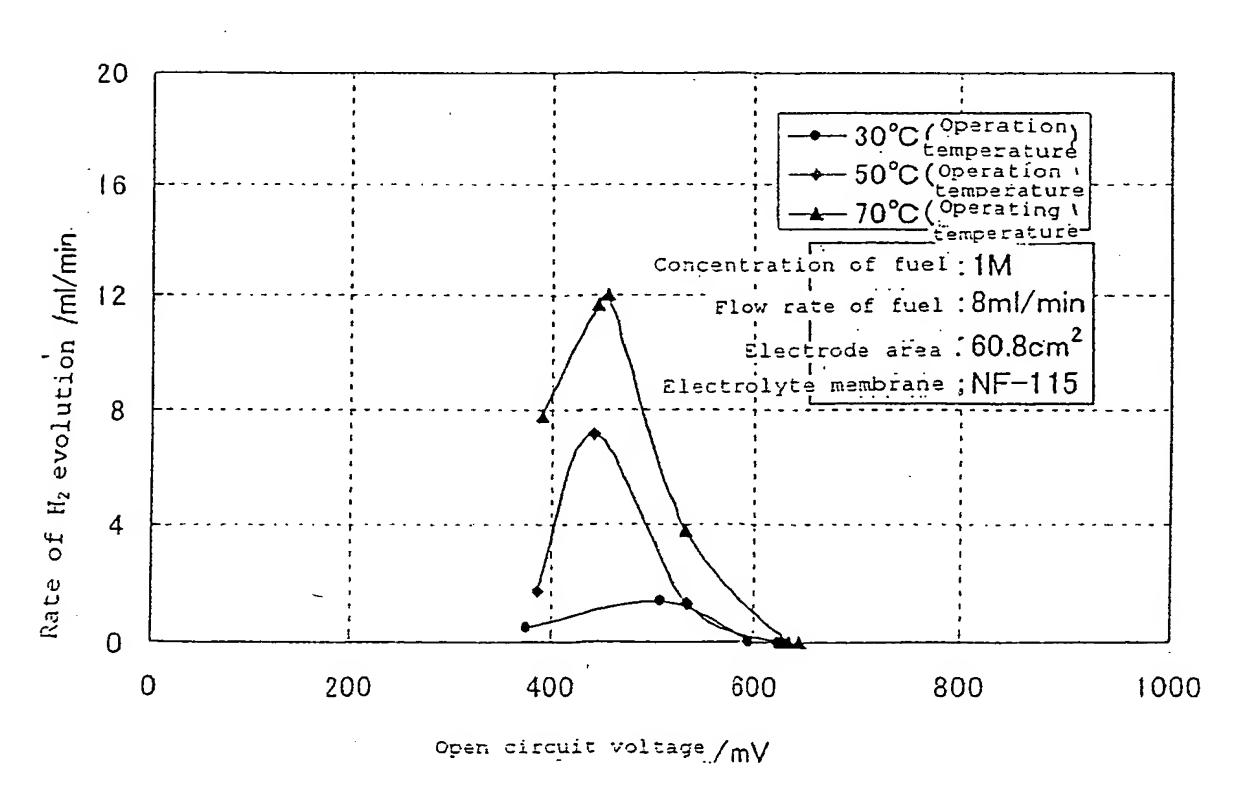


Electrolyte membrane (Mafion 115)

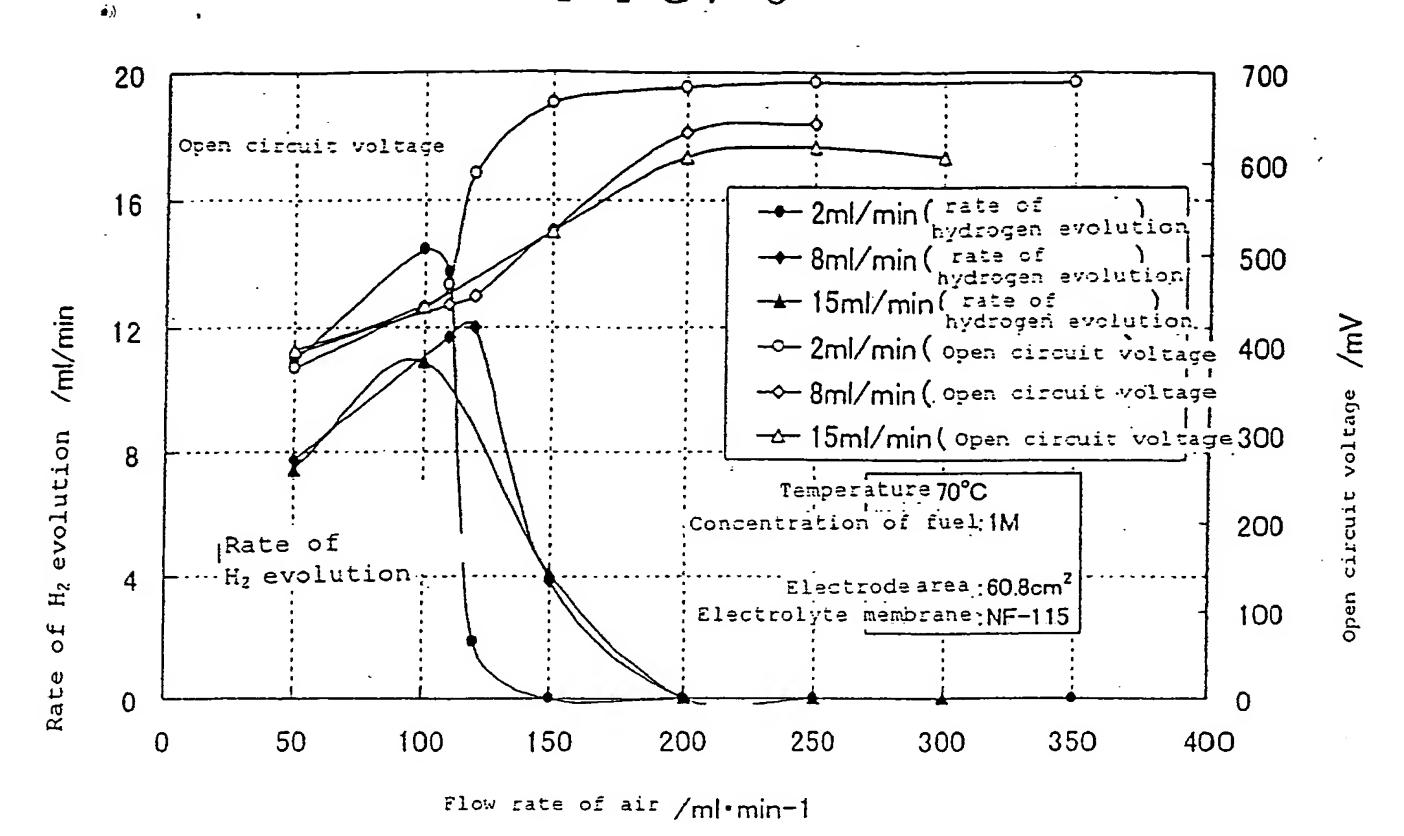
4)



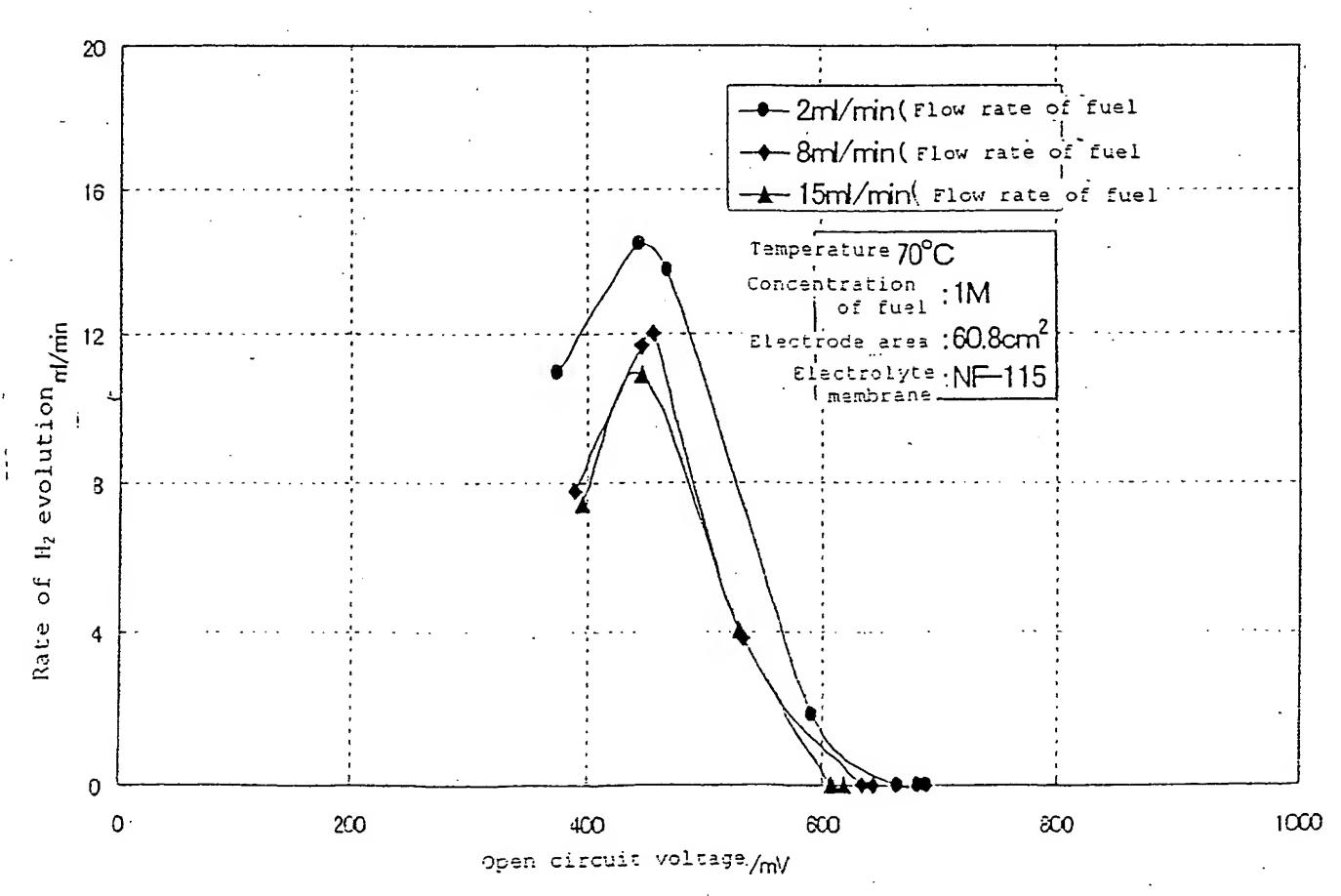
F I G. 4



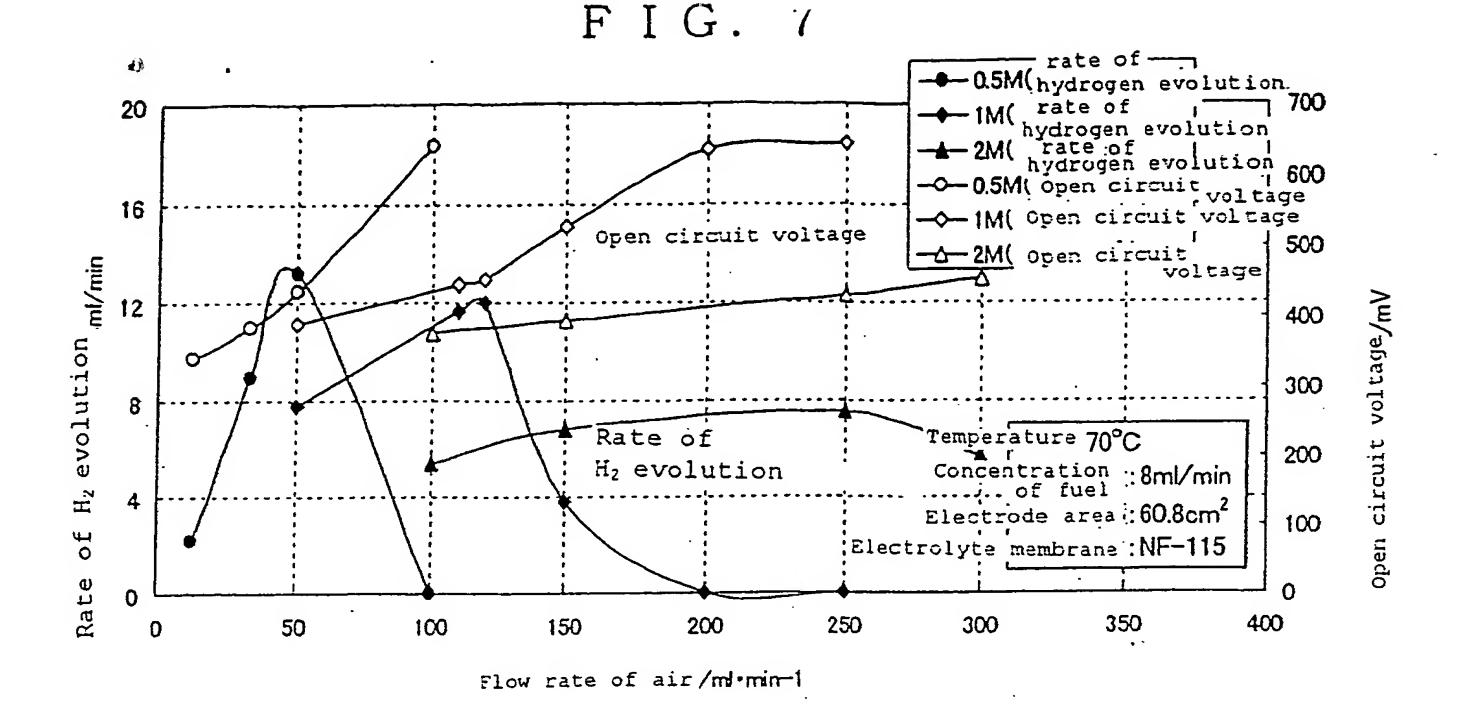
3/3 7

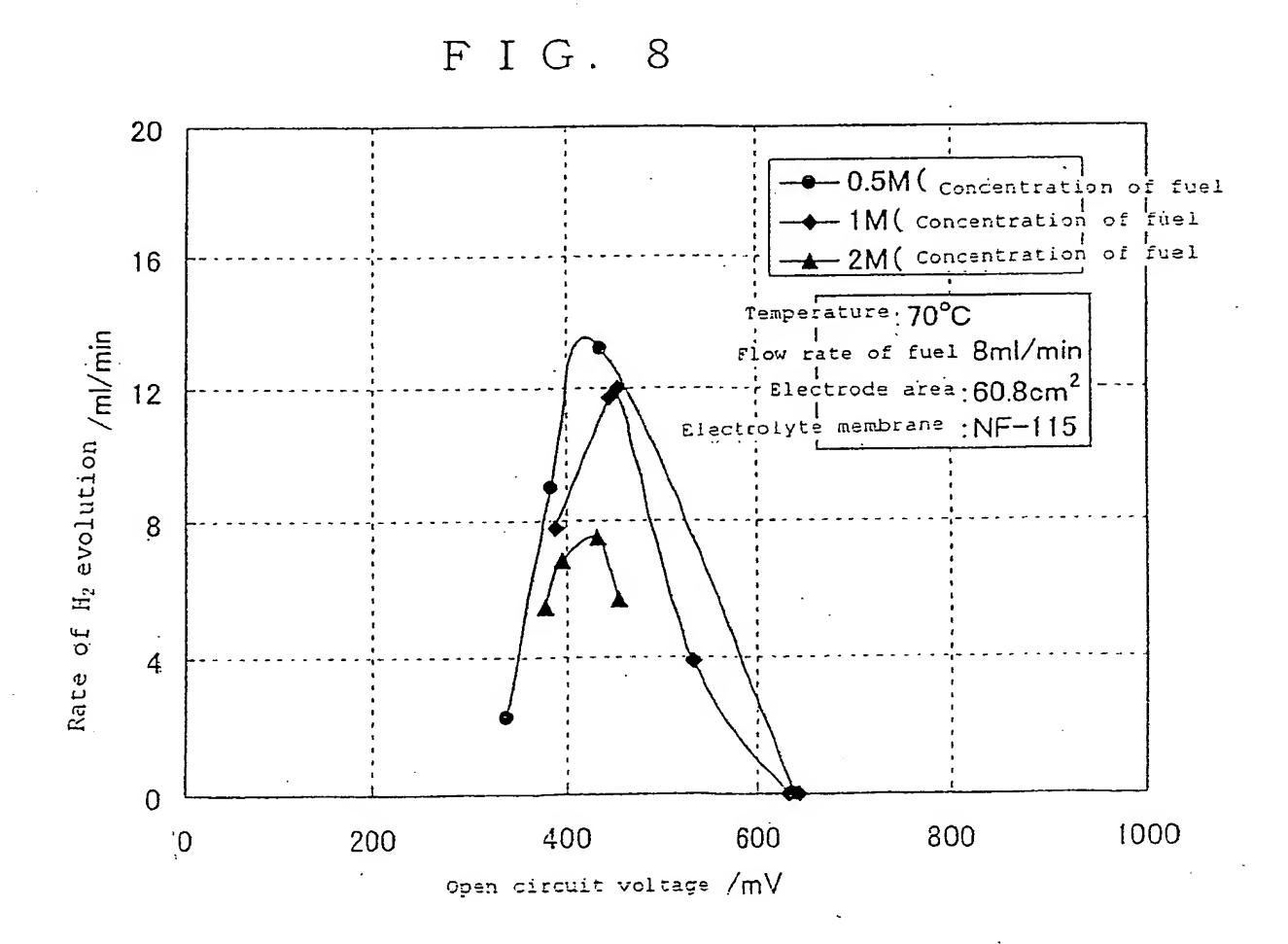


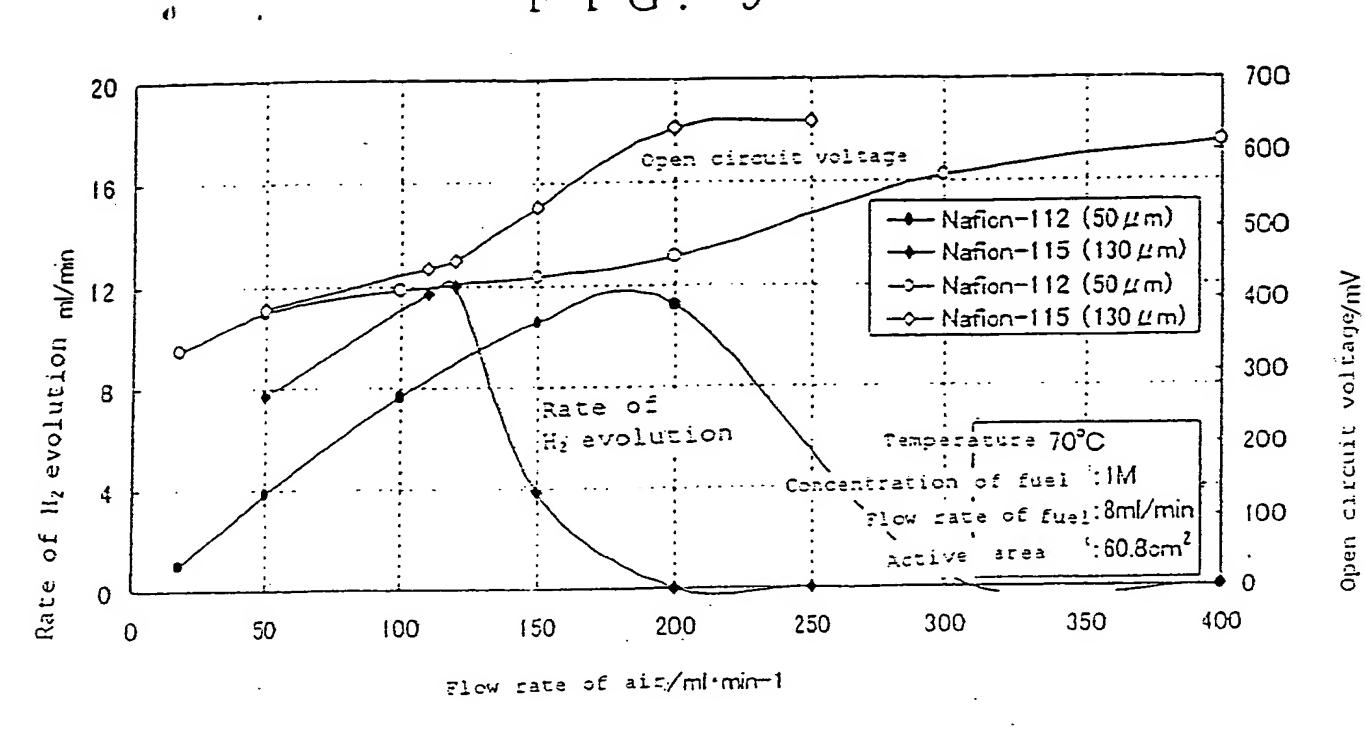
F I G. 6



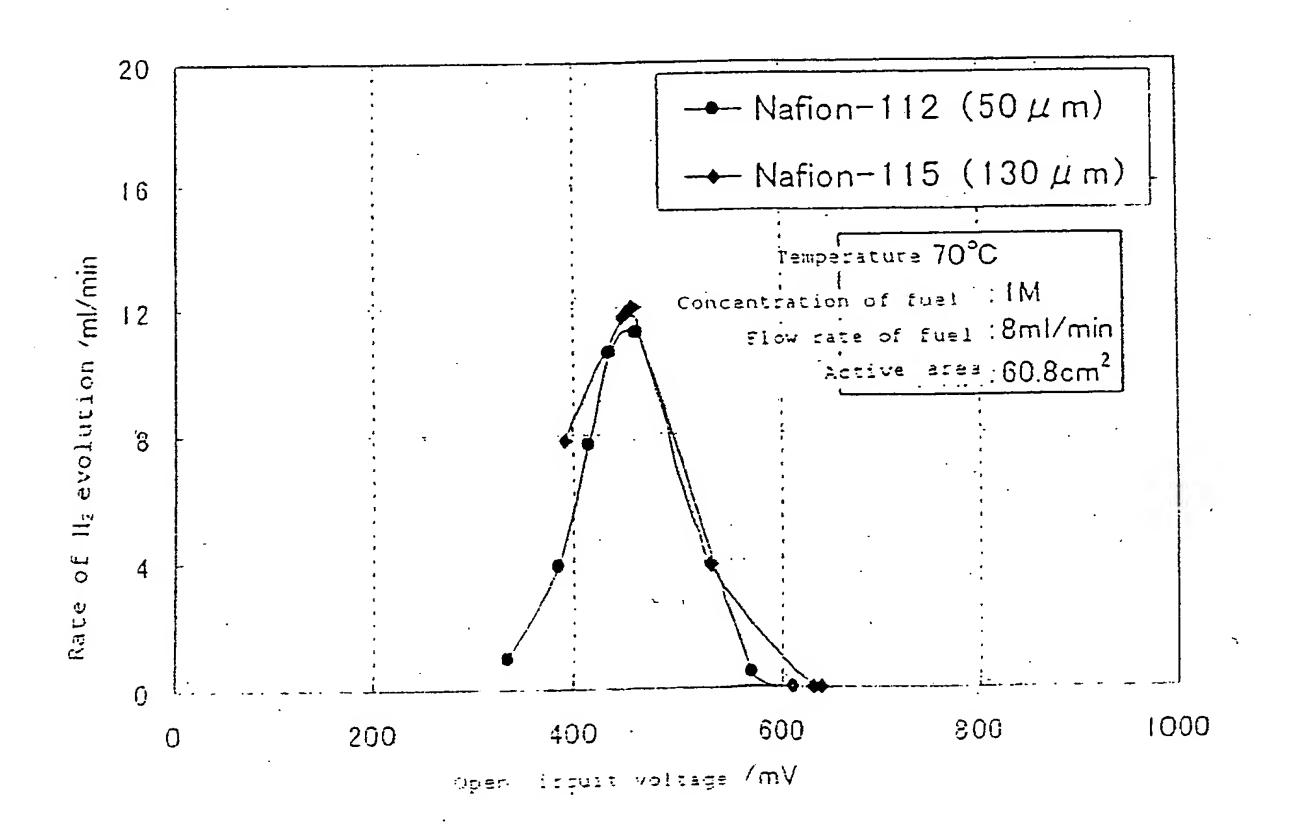
4/3 7



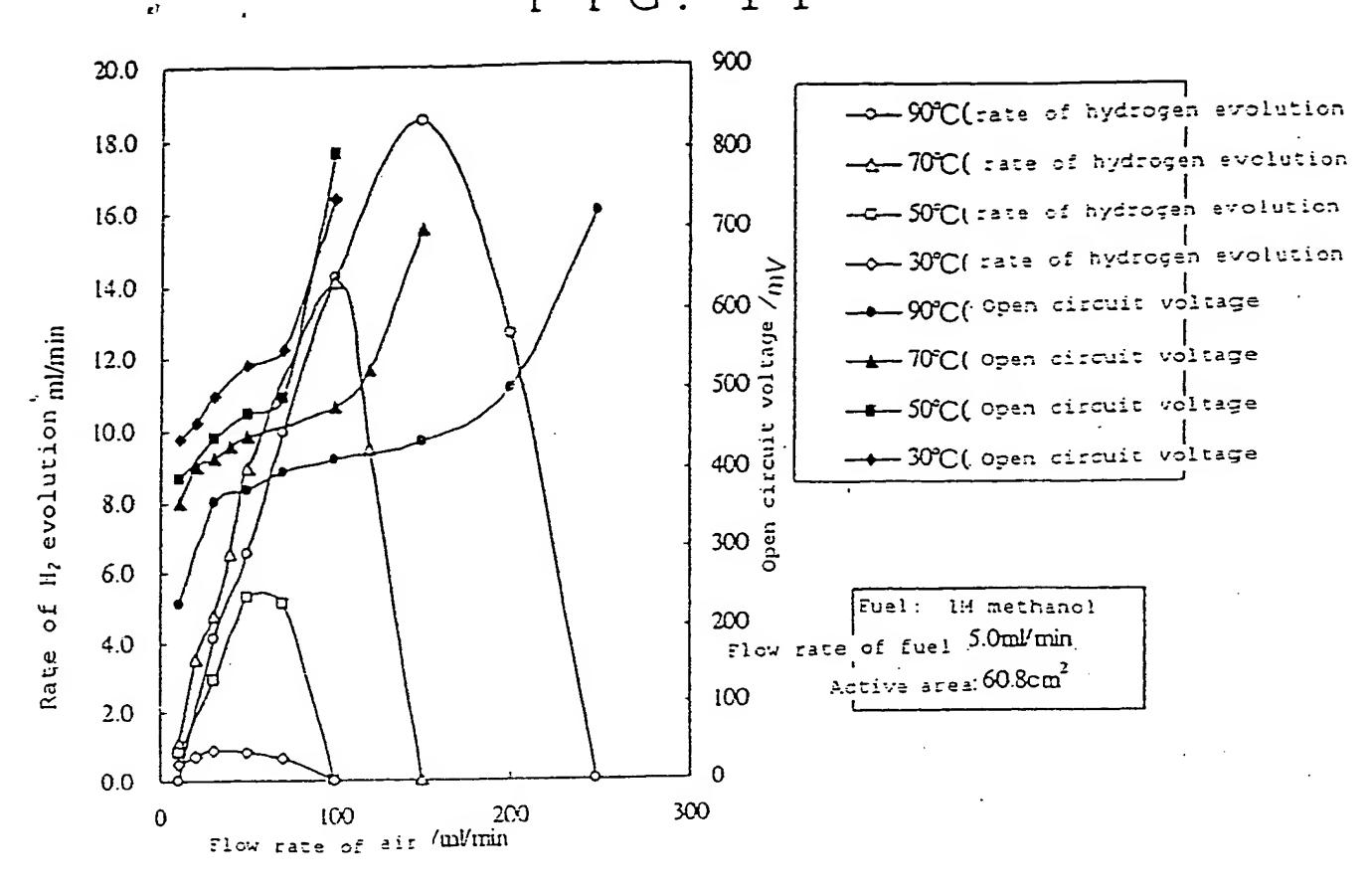




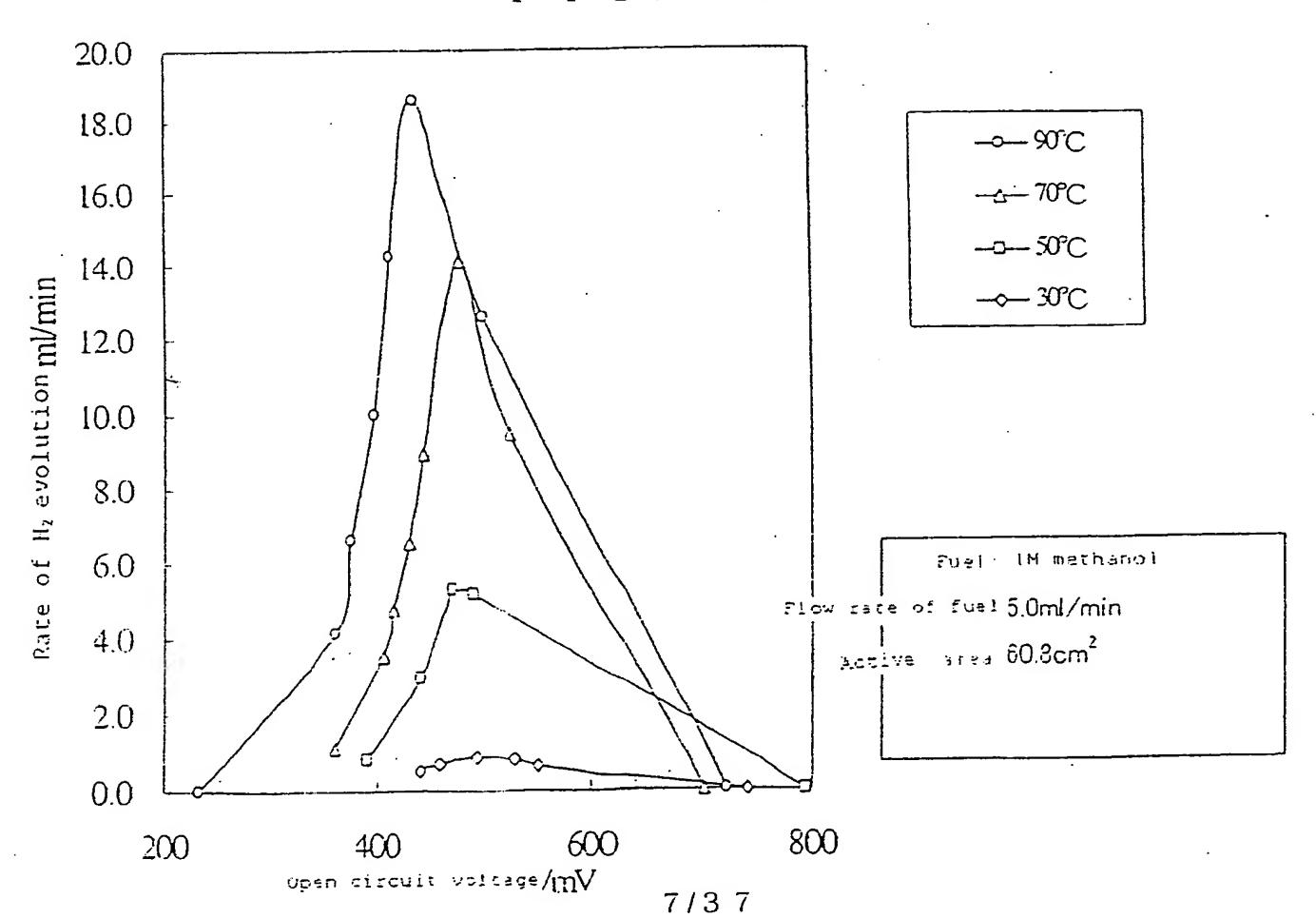
F [ G. 10



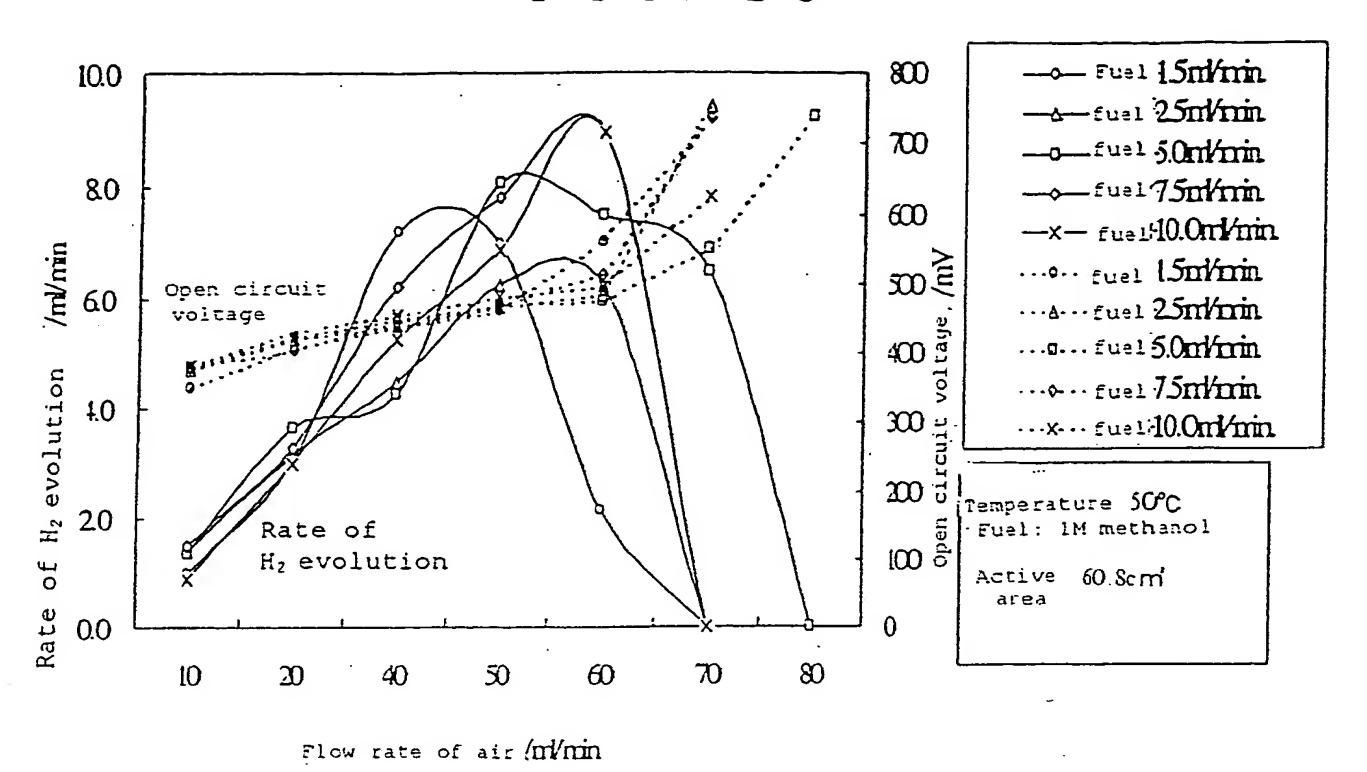




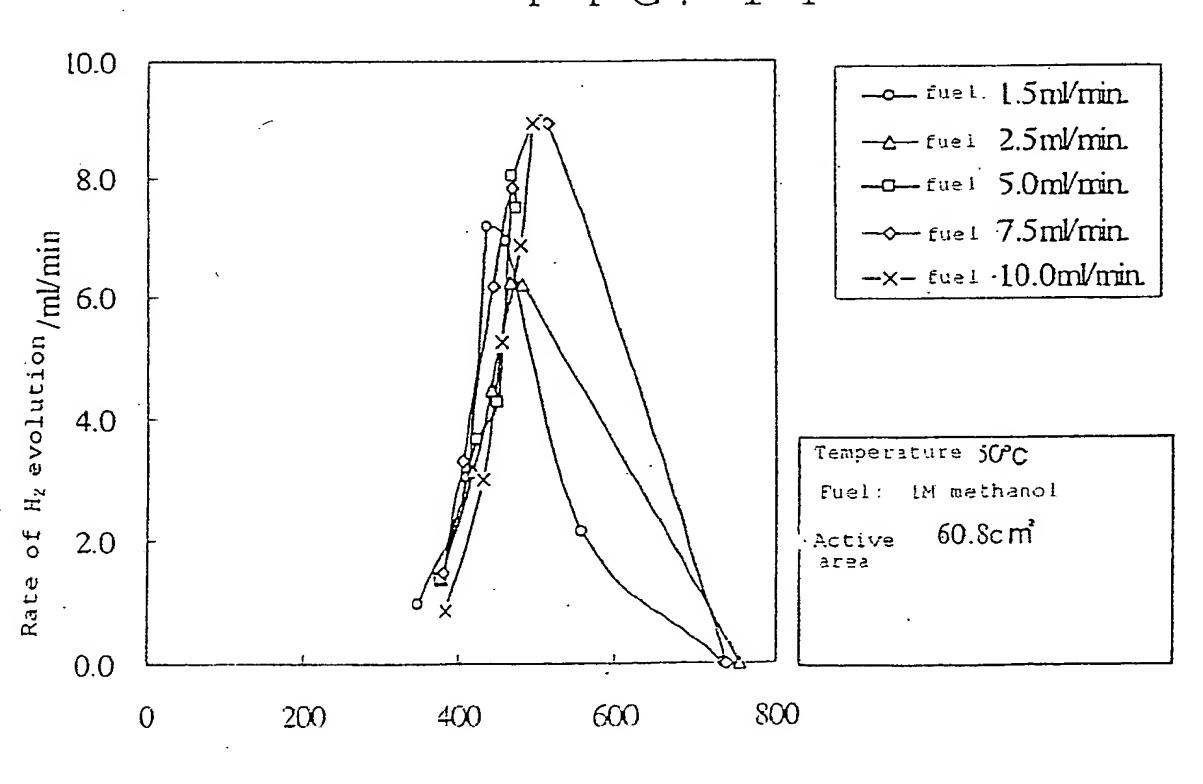
F I G. 12



F I G. 13



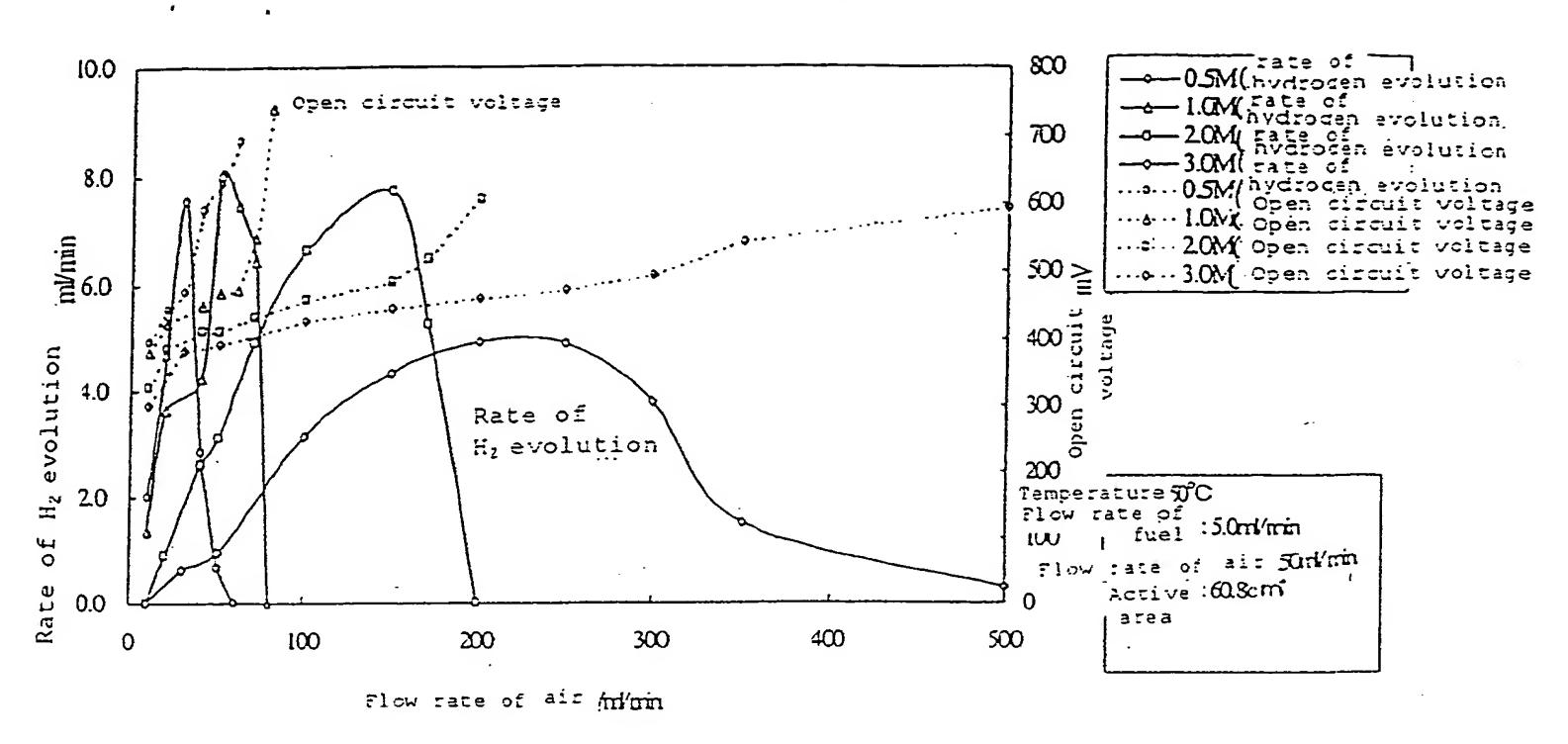
F I G. 14



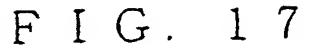
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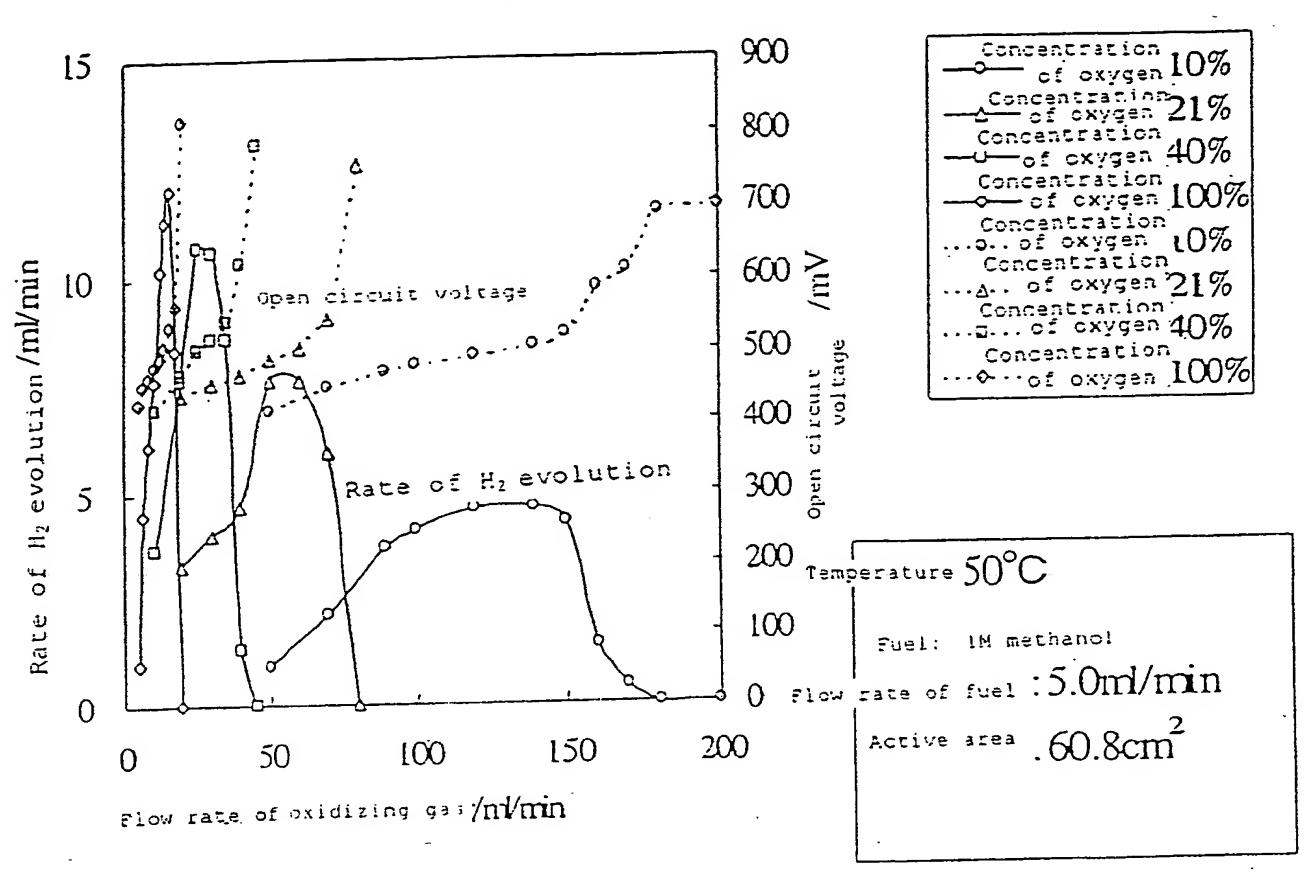
Open circuit voltage /mV

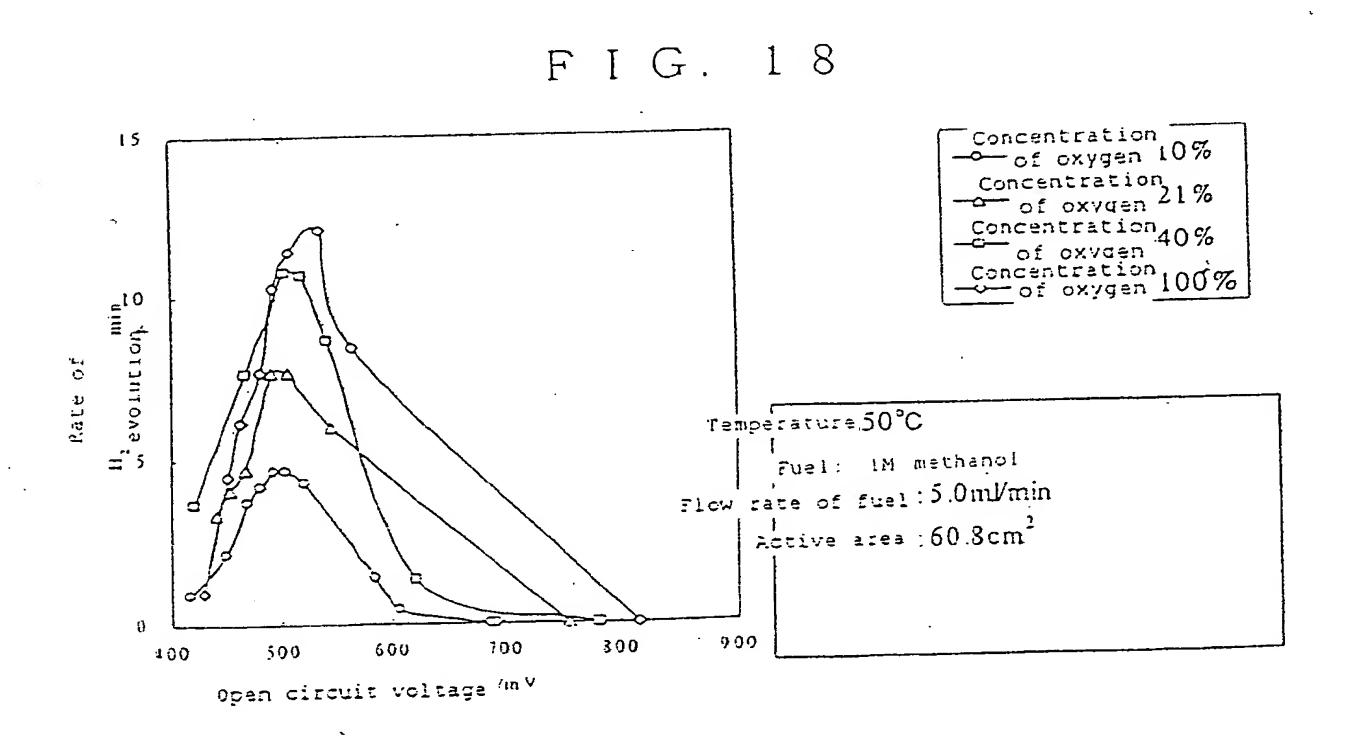
F I G. 15

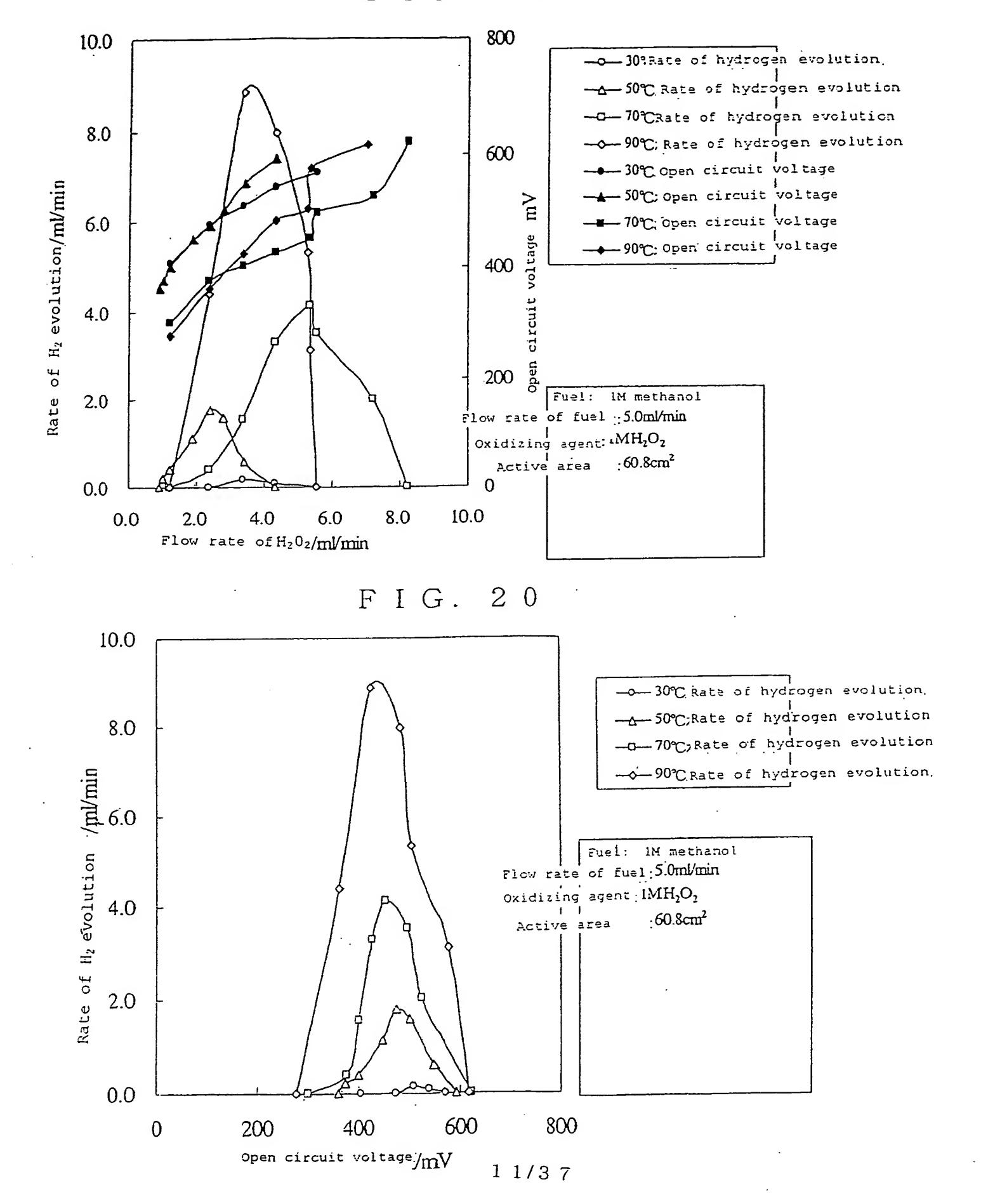


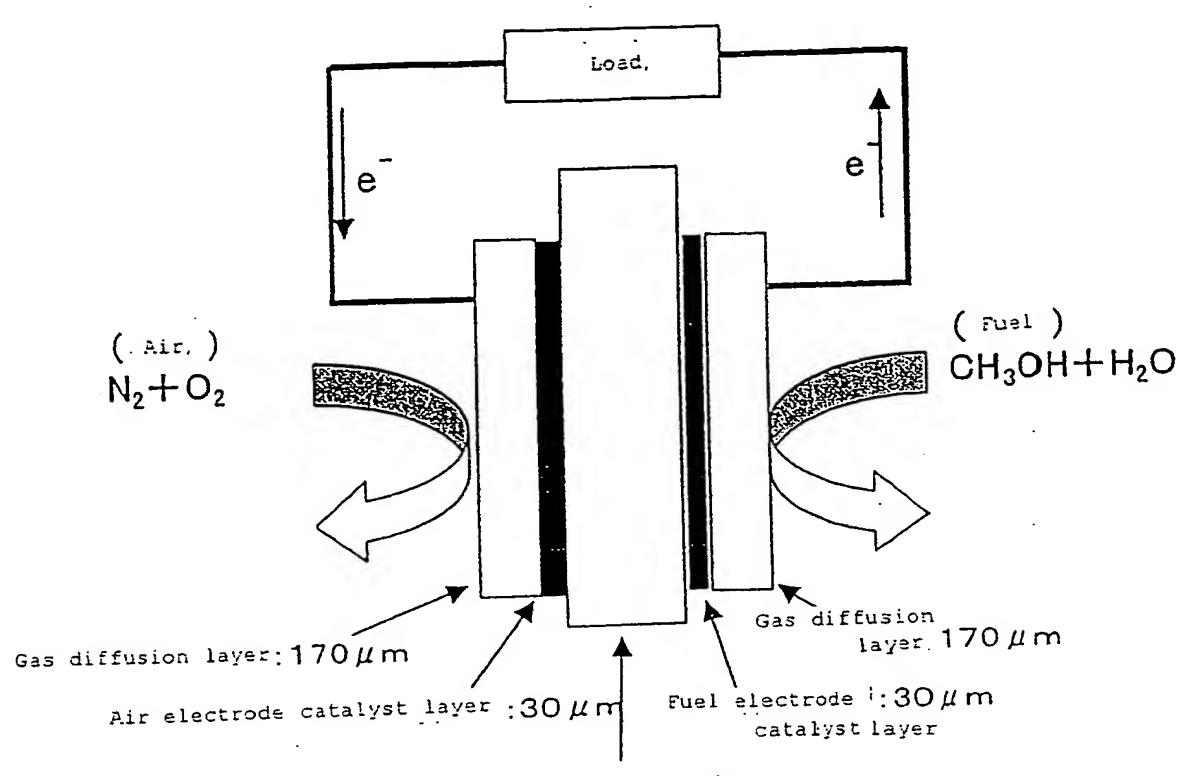
F I G. 16 10.0  $\rightarrow$  0.5M 0.8 -∠- 1.0M /ml/min -c-2.0M6.0 → 3.0M Rate of H<sub>2</sub> evolution 4.0 Temperature 50°C Flow rate of fuel: 5.0ml/min Active :60.8cm area 2.0 0.0 600 800 0 200 400 Open circuit voltage /mV





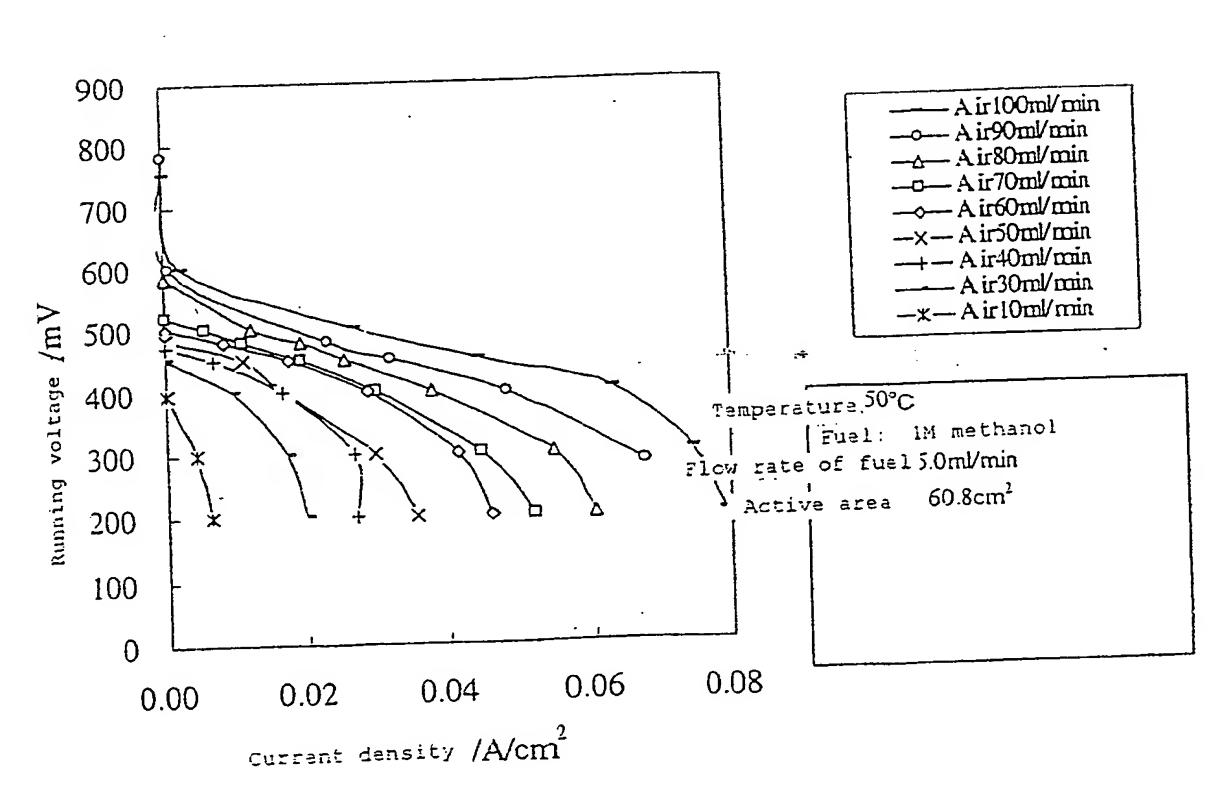




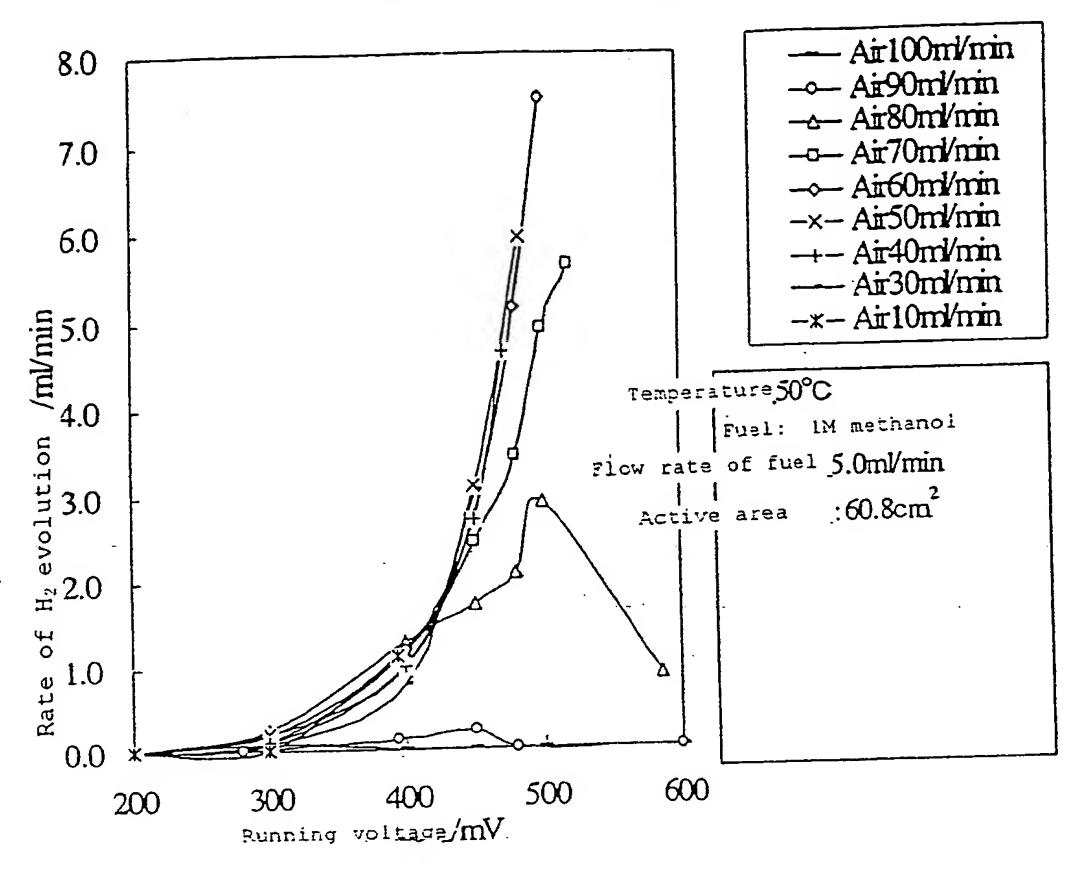


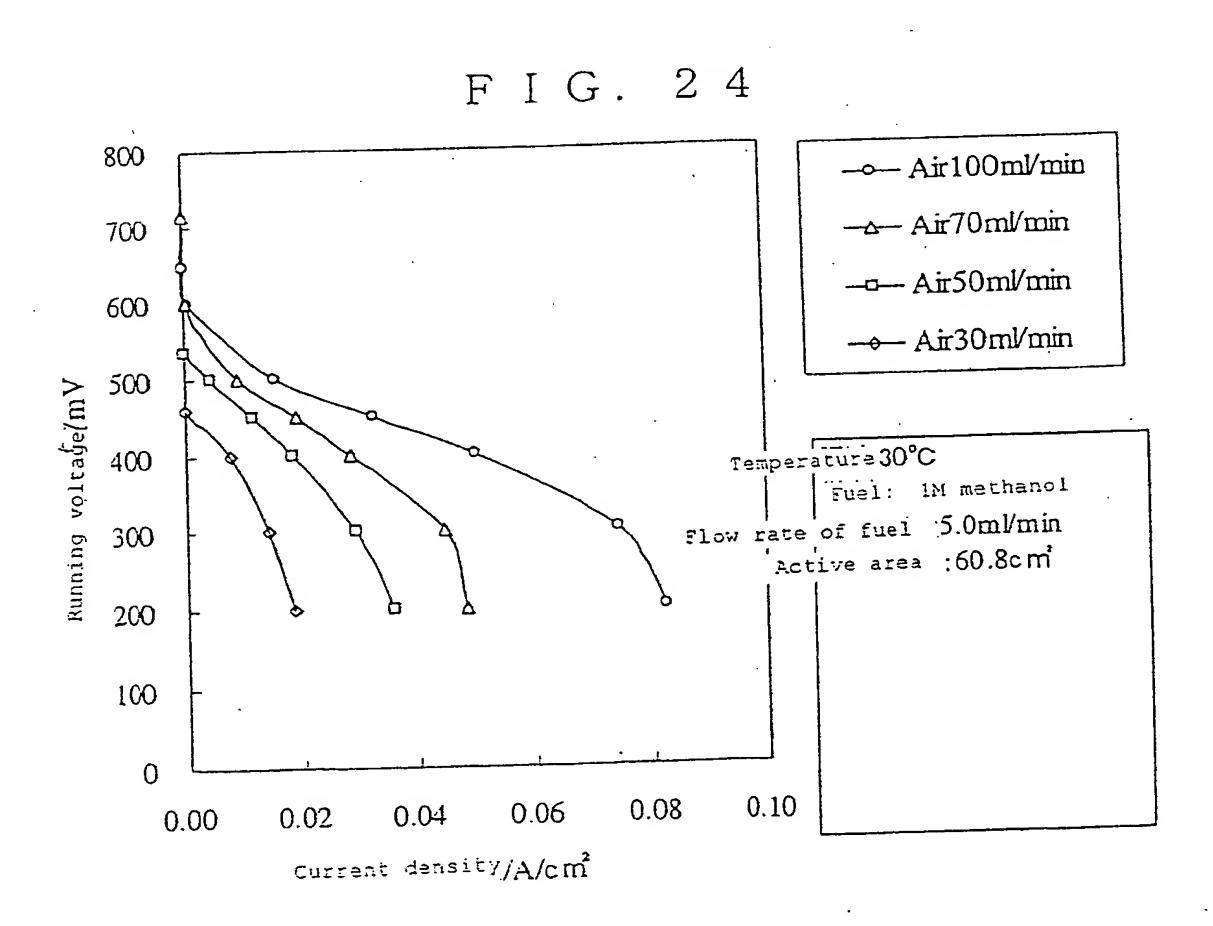
Electrolyte membrane (Nafion)

F I G. 22



F I G. 23





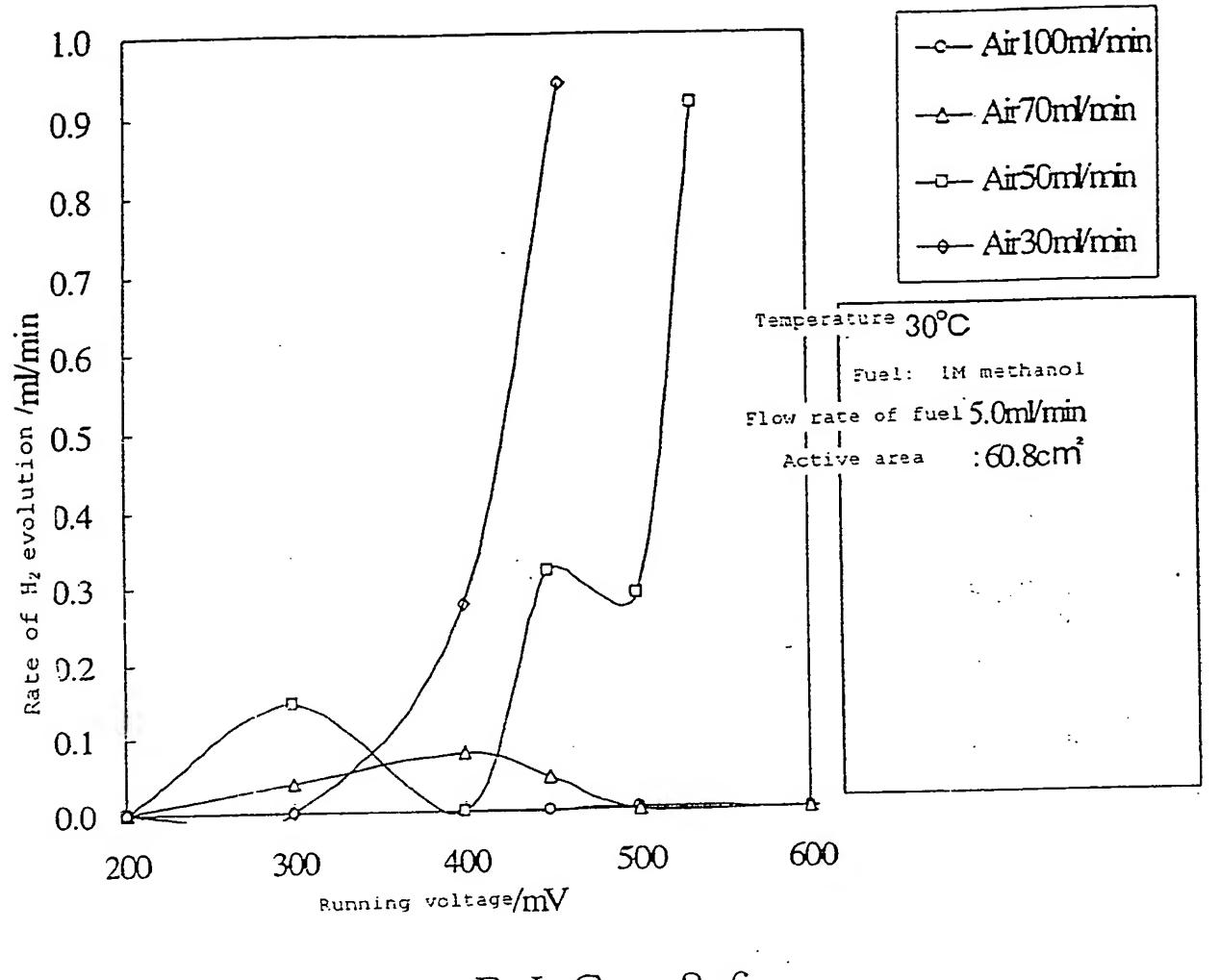
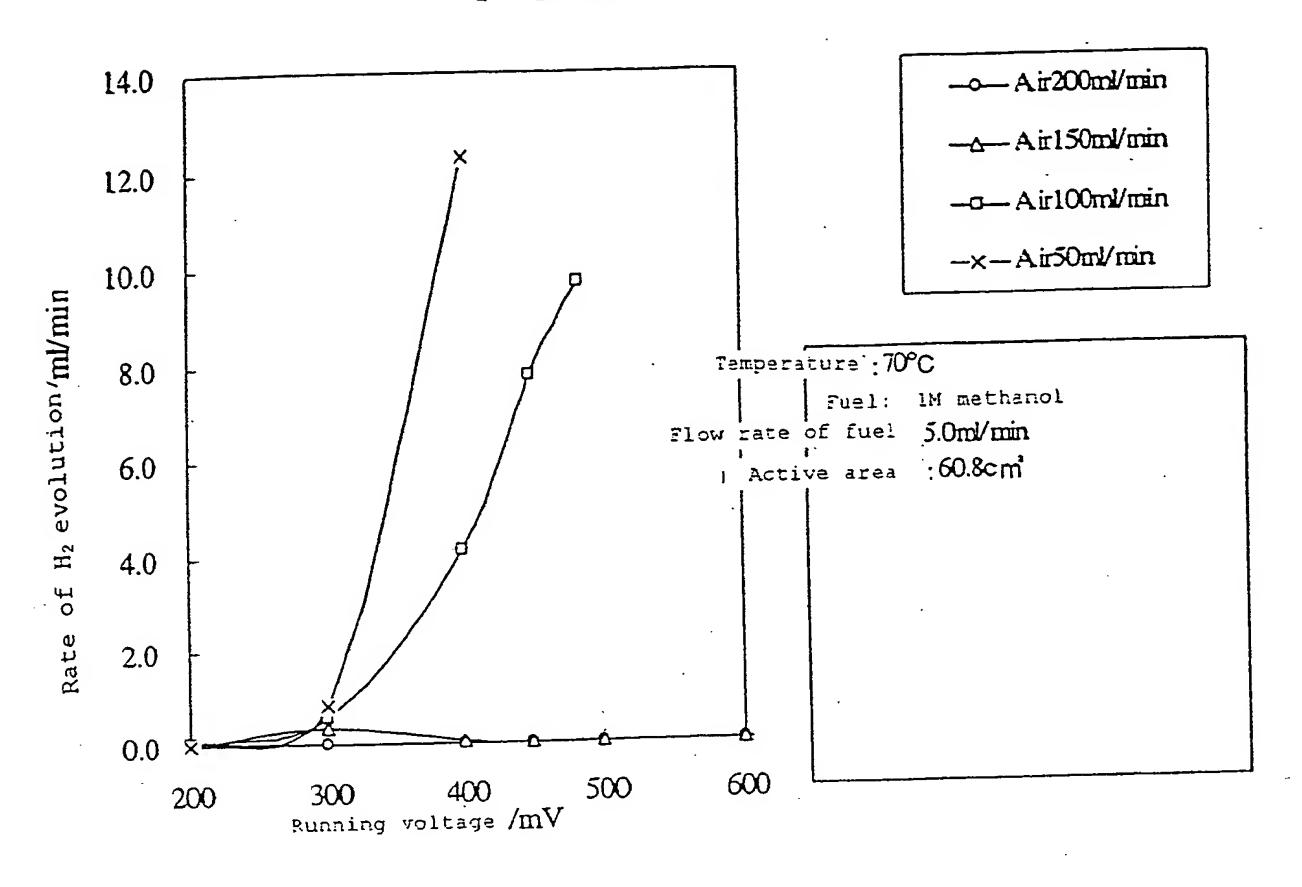
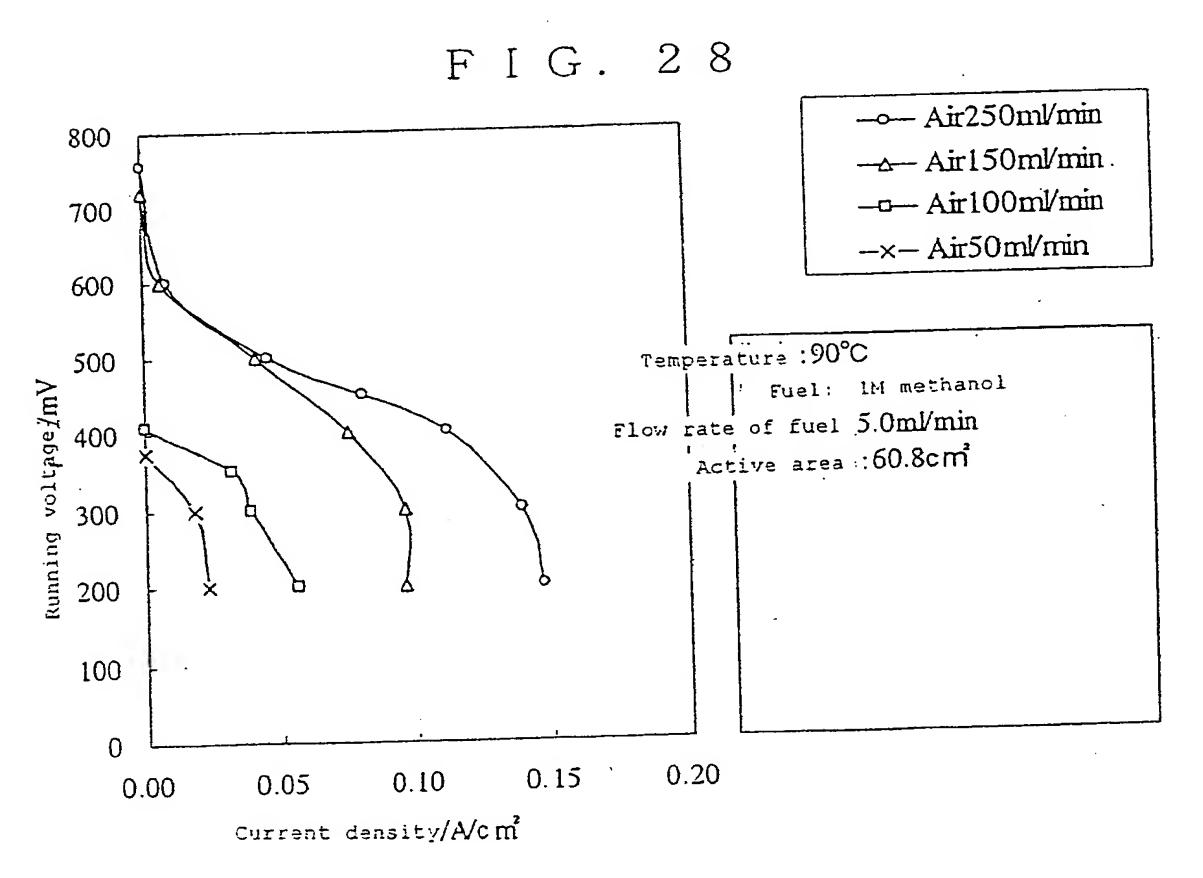


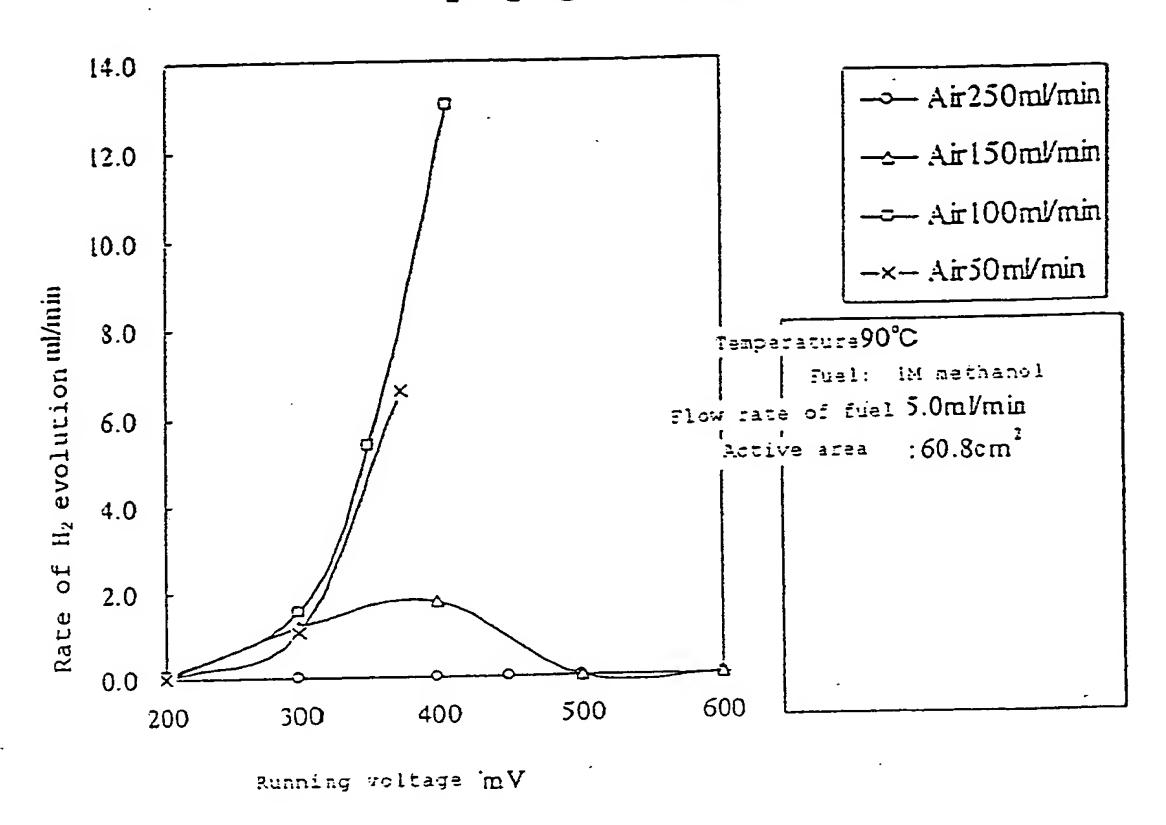
FIG. 800 \_o\_ Air200ml/min 700 —a— Air150ml/min \_o\_ Air100ml/min 600 -x-Air50ml/min 500 Running voltage/nfV 400 Fuel: 1M methanol Flow rate of fuel 5.0ml/min 300 60.8cm Active area 200 100 0 0.00 0.02 0.04 0.06 0.08 0.10 0.12 0.14 0.16 Current density/A/cm<sup>2</sup>

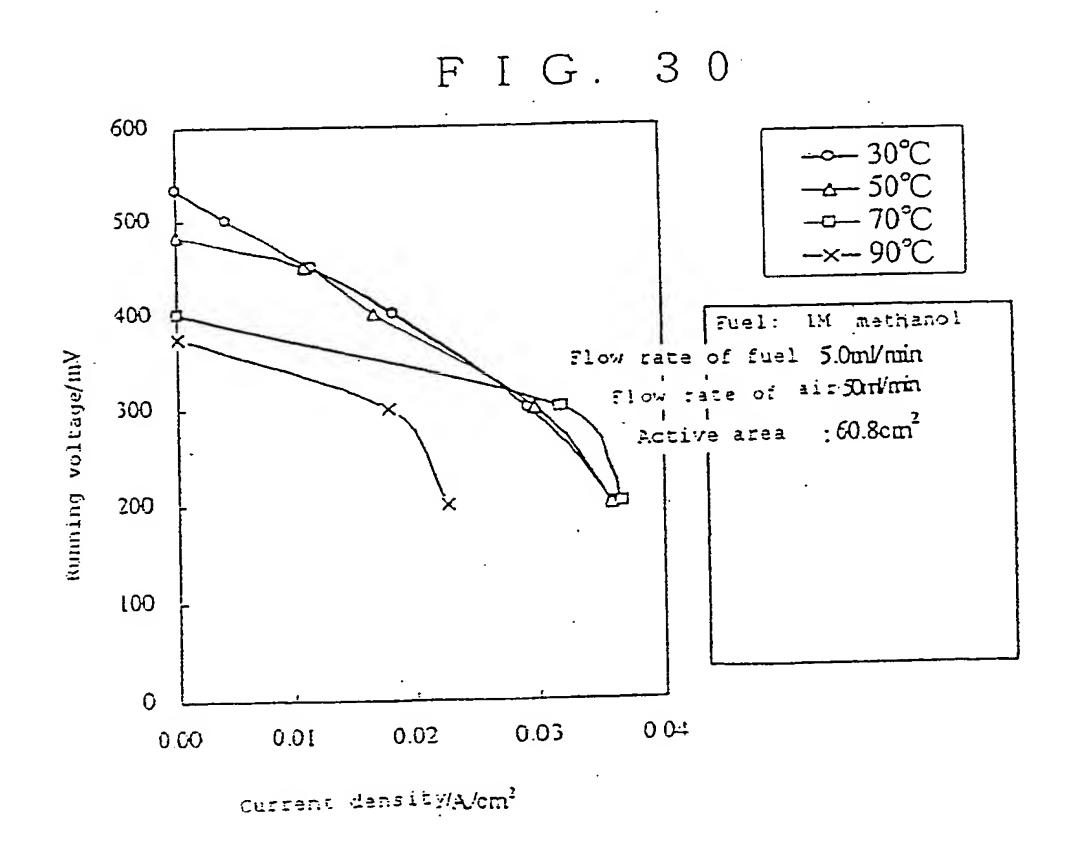
F I G. 27

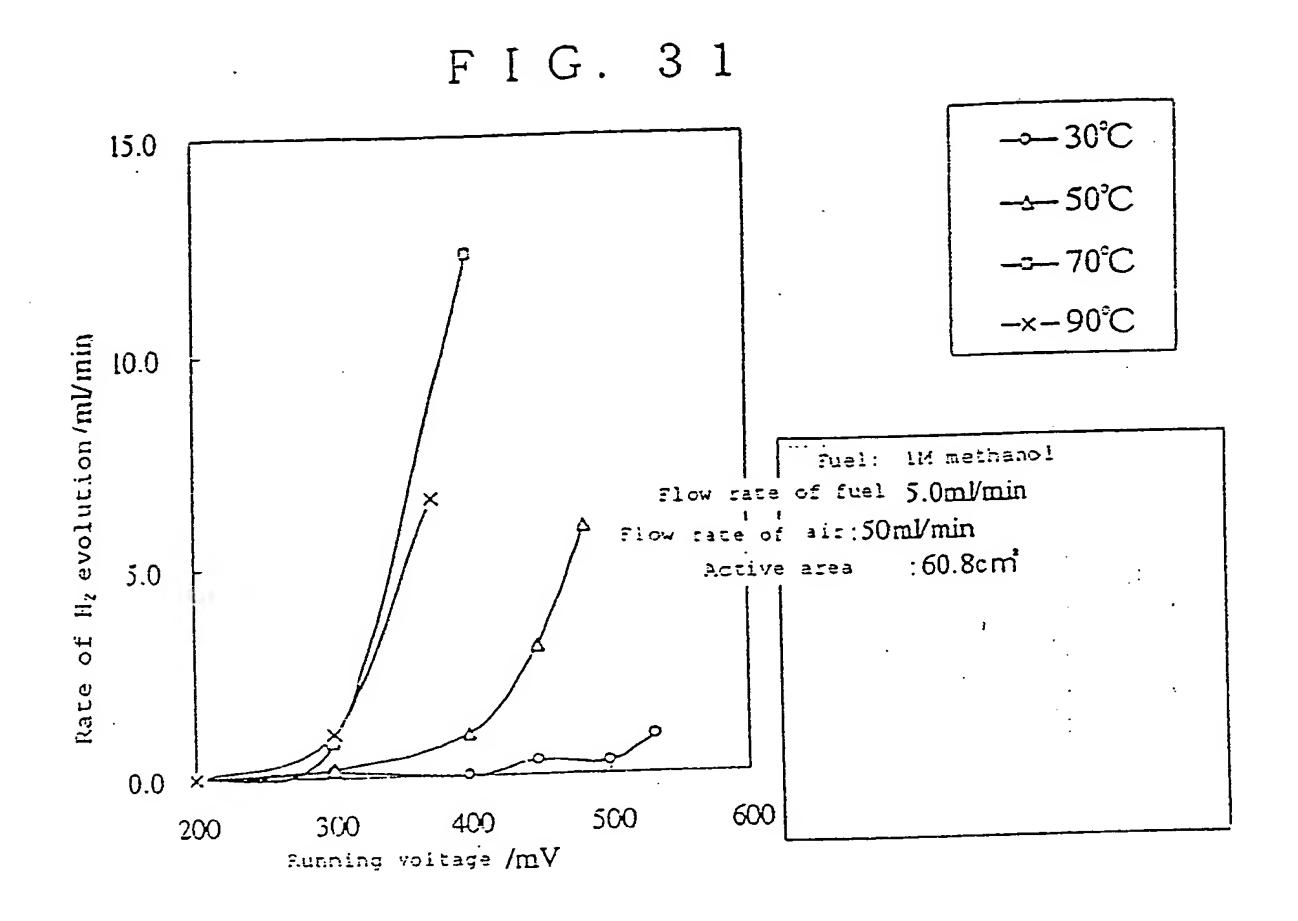


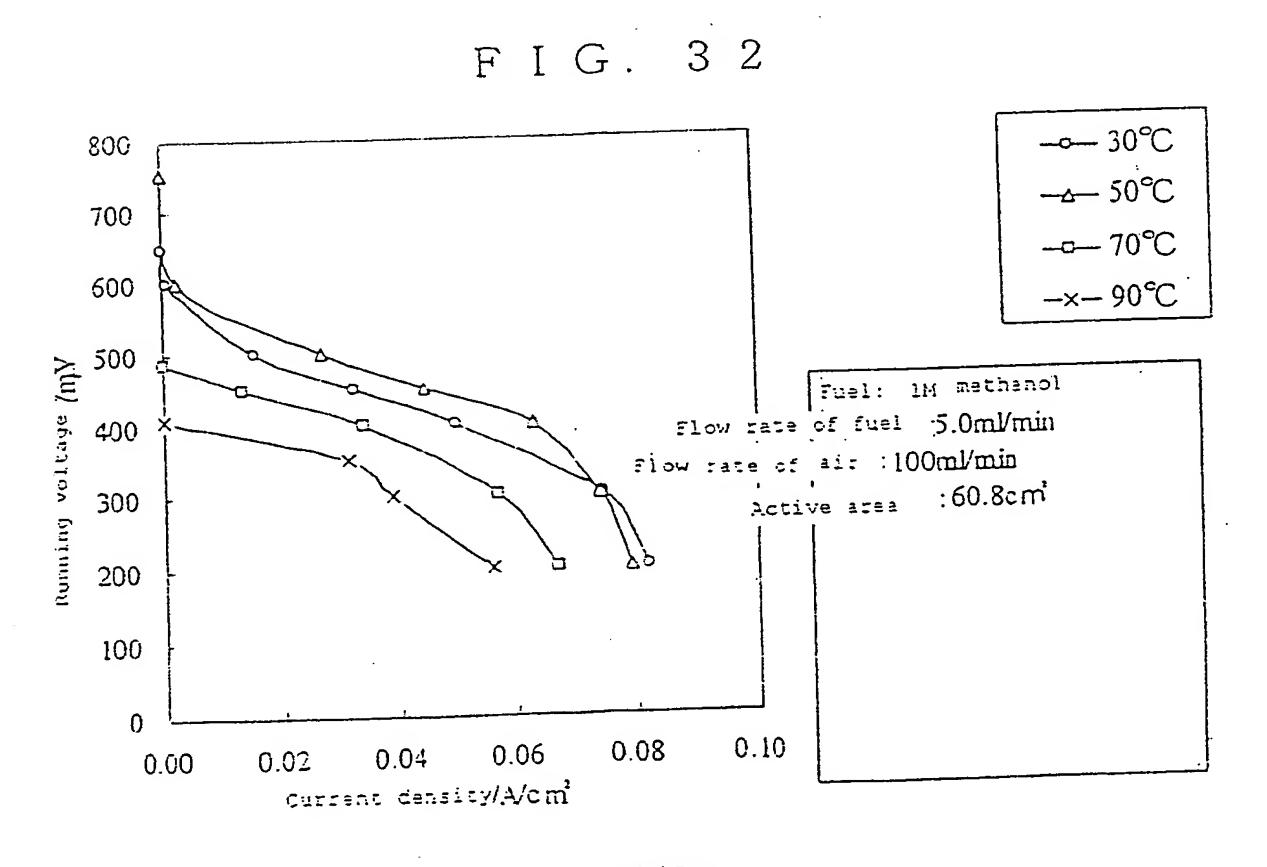


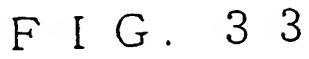
F I G. 29

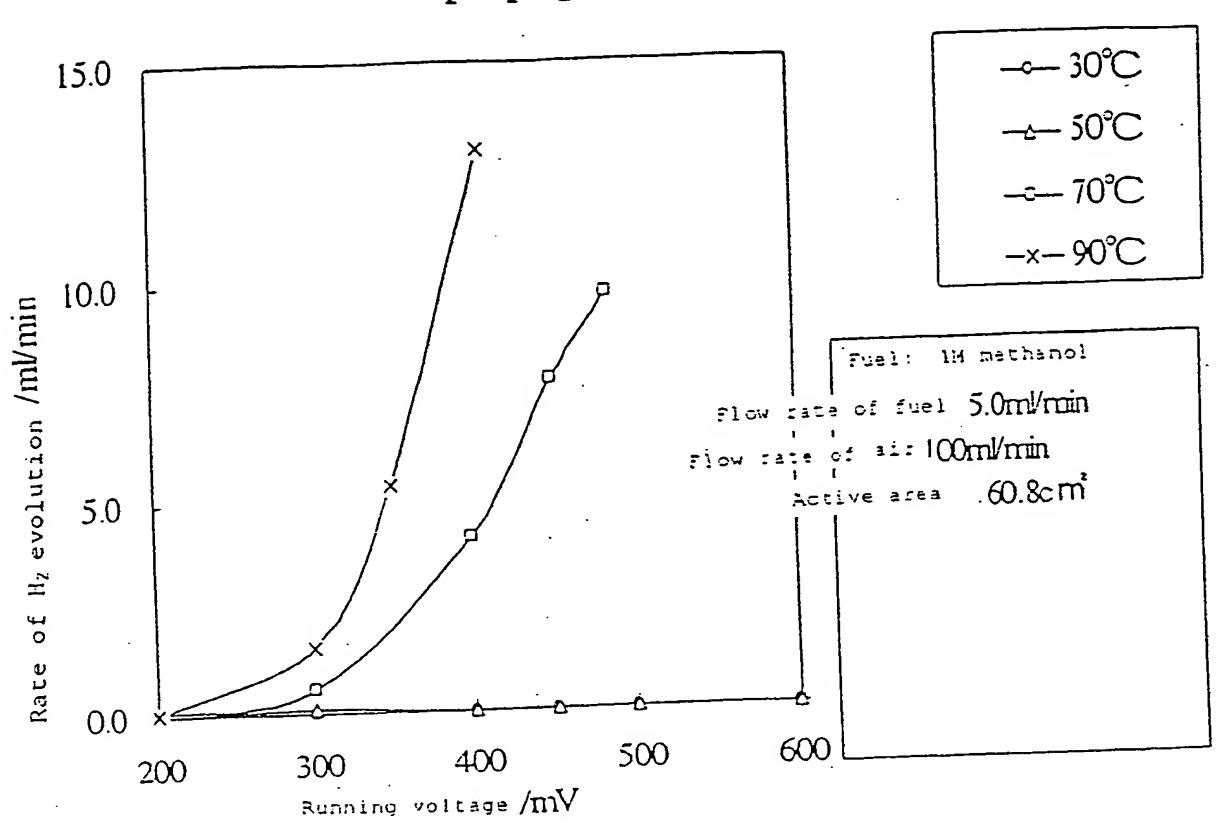


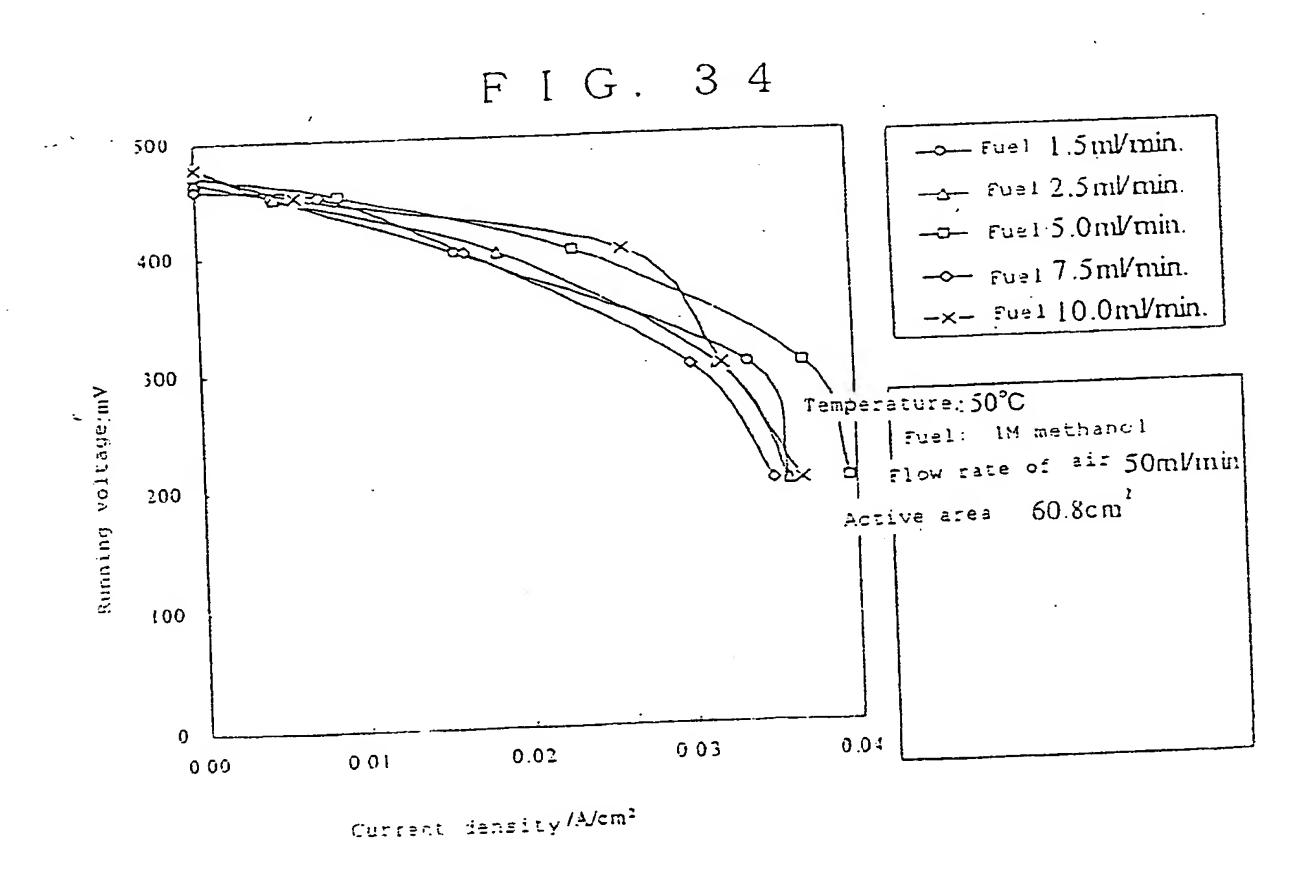




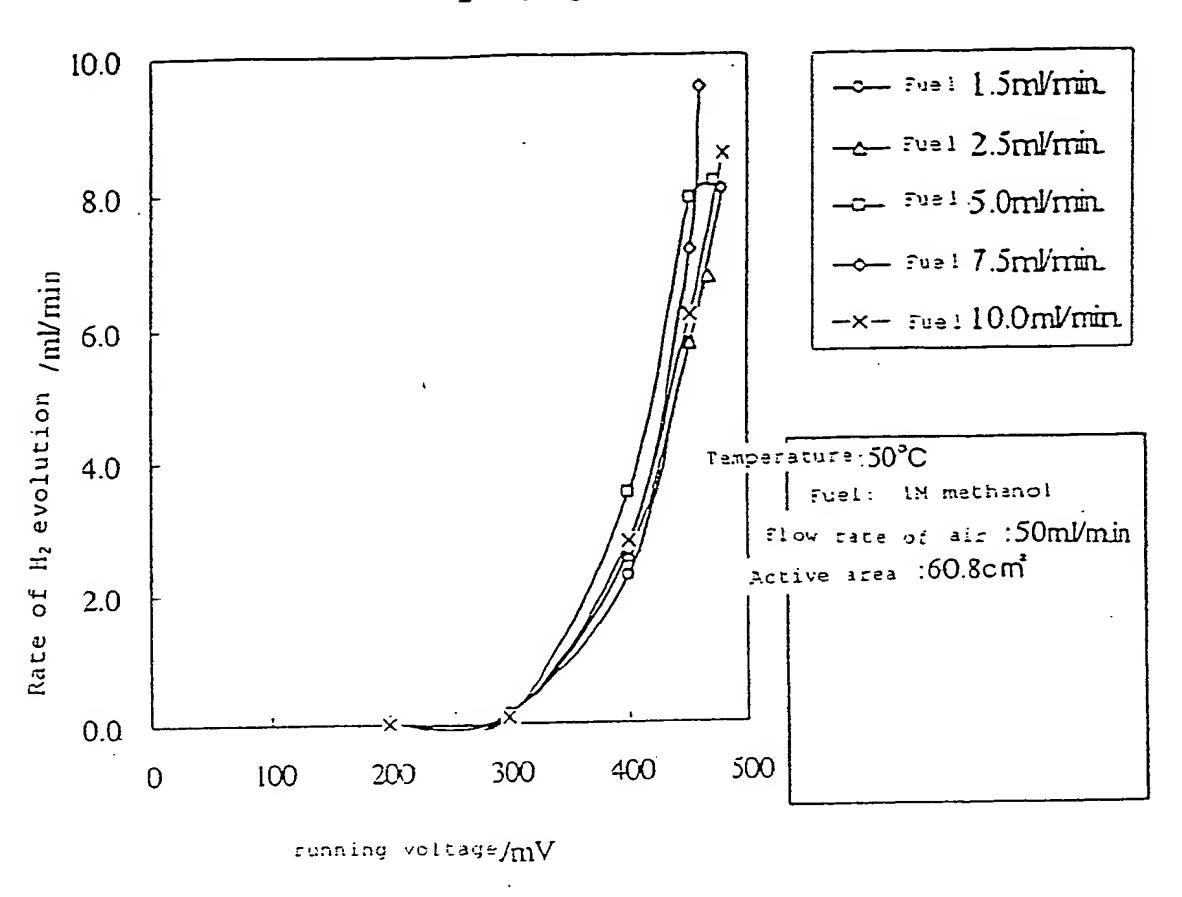


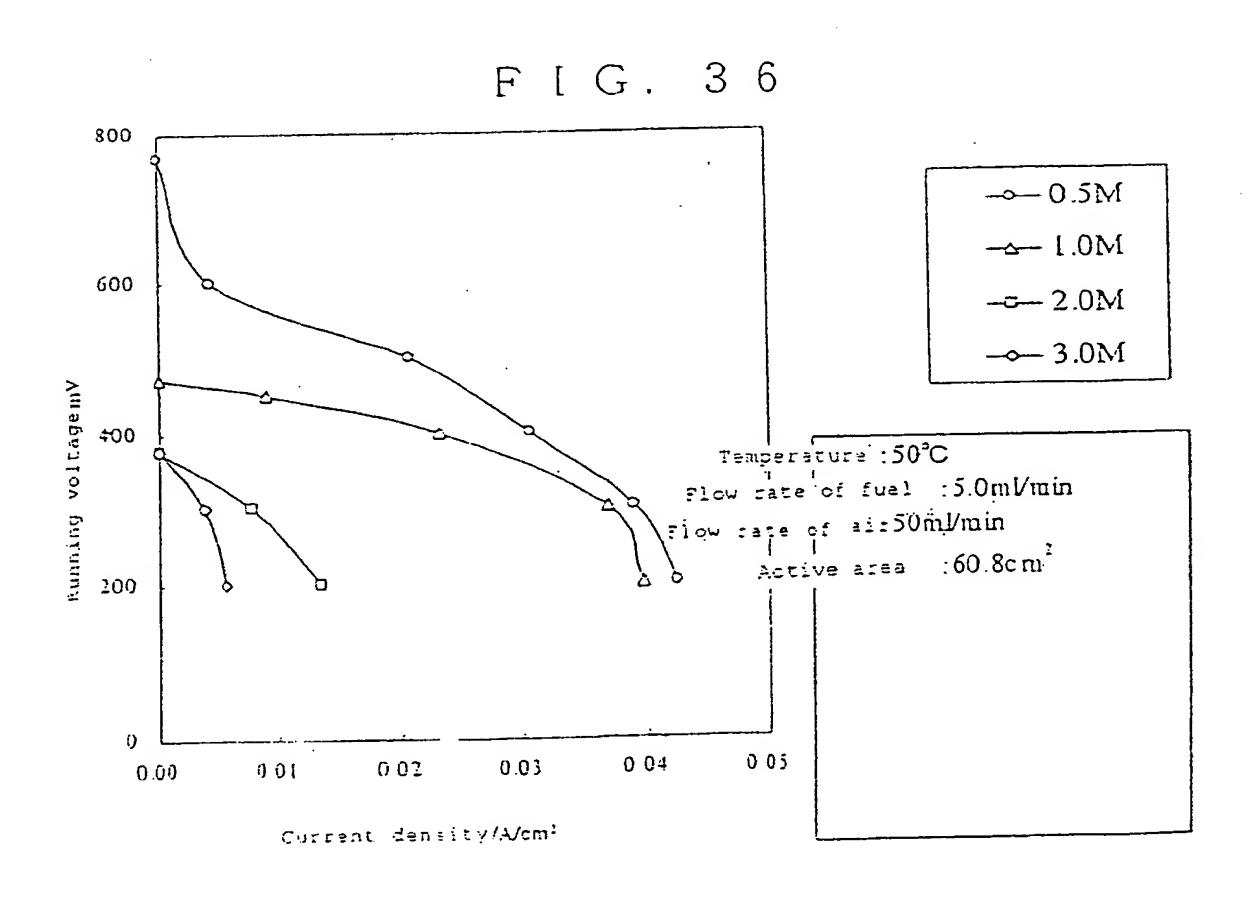




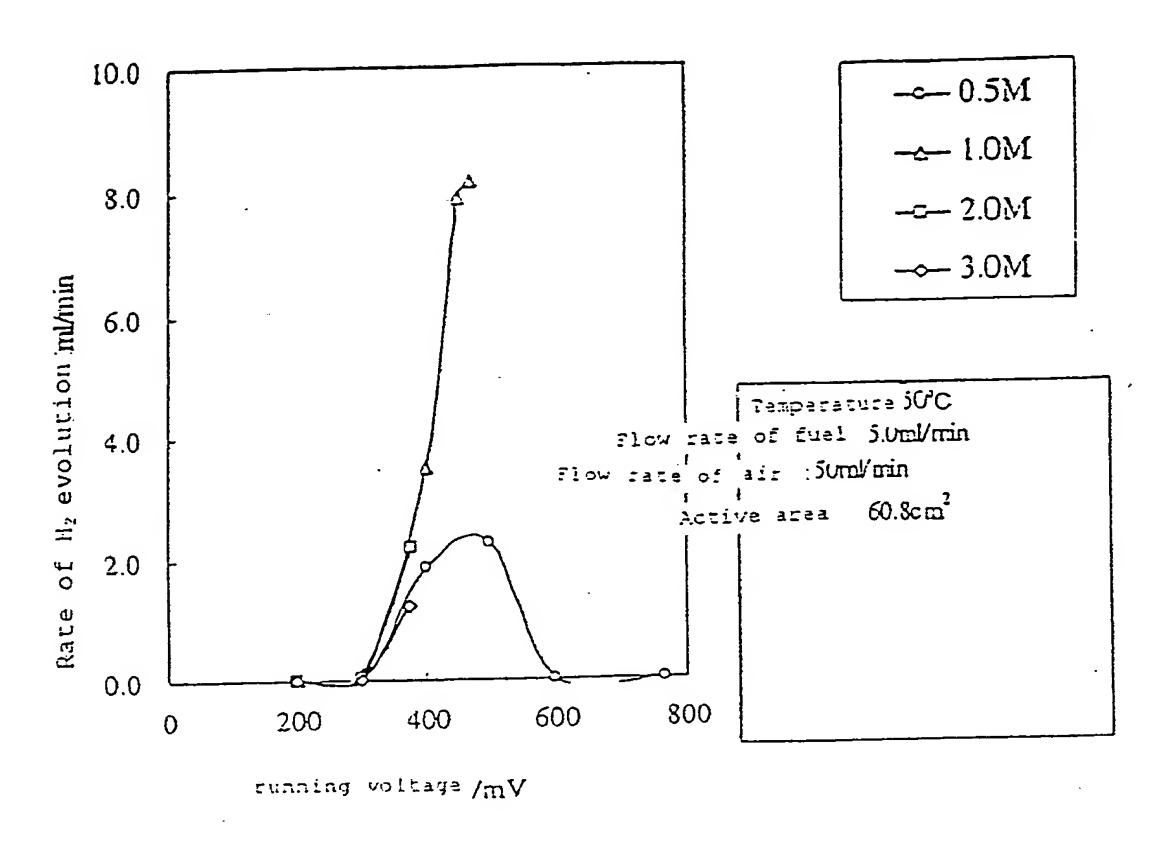


F I G. 35



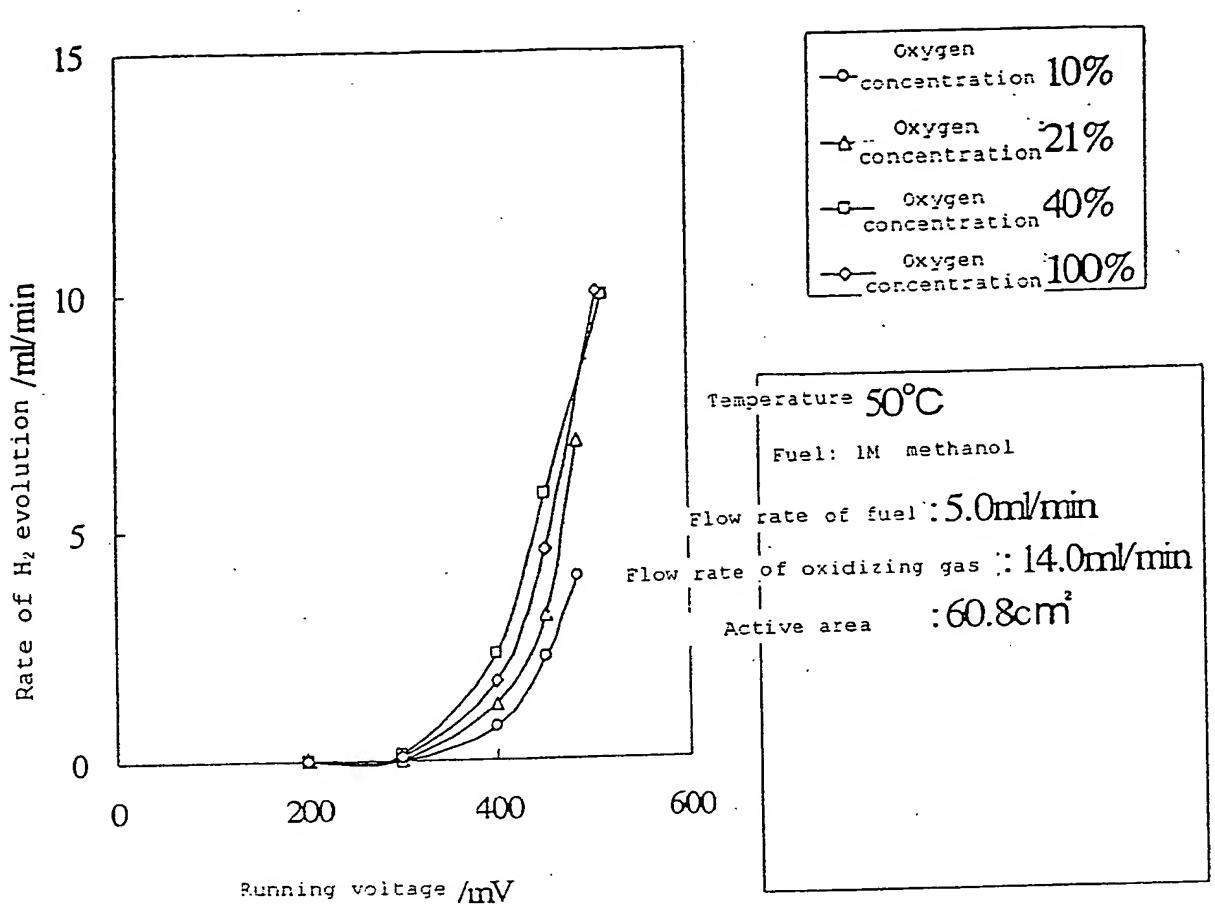


F I G. 37

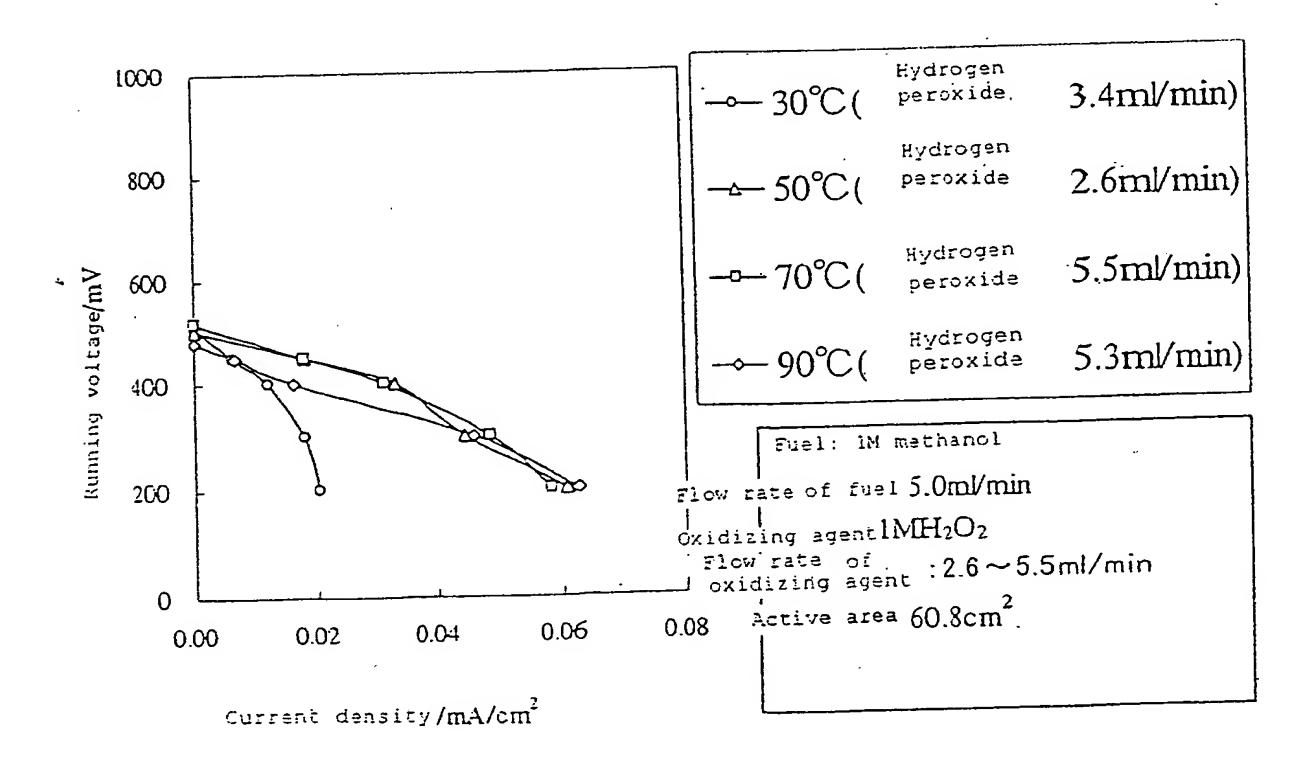


F I G. 38 Oxygen
-o-concentration 10%
Oxygen 600 -s concentration21% Oxygen -c-concentration[0%] \_concentration[00% 400 Temperature 50°C Running voltage ImV Fuel: [M methanol Flow rate of fuel: 5.0ml/min Flow rate of oxidizing gas 200 14.0ml/min :60.8cm<sup>2</sup> Active area 0 0.06 0.04 0.02 0.00 Current density/A/cm<sup>2</sup>

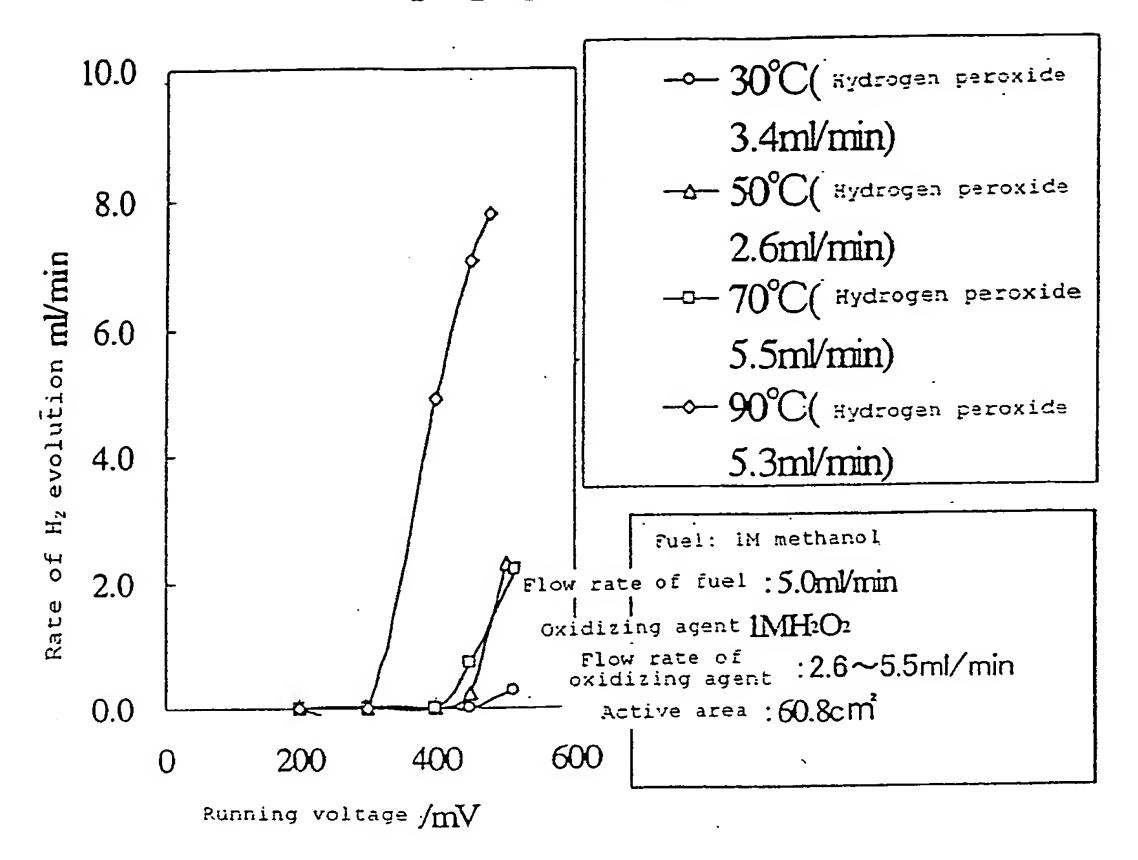


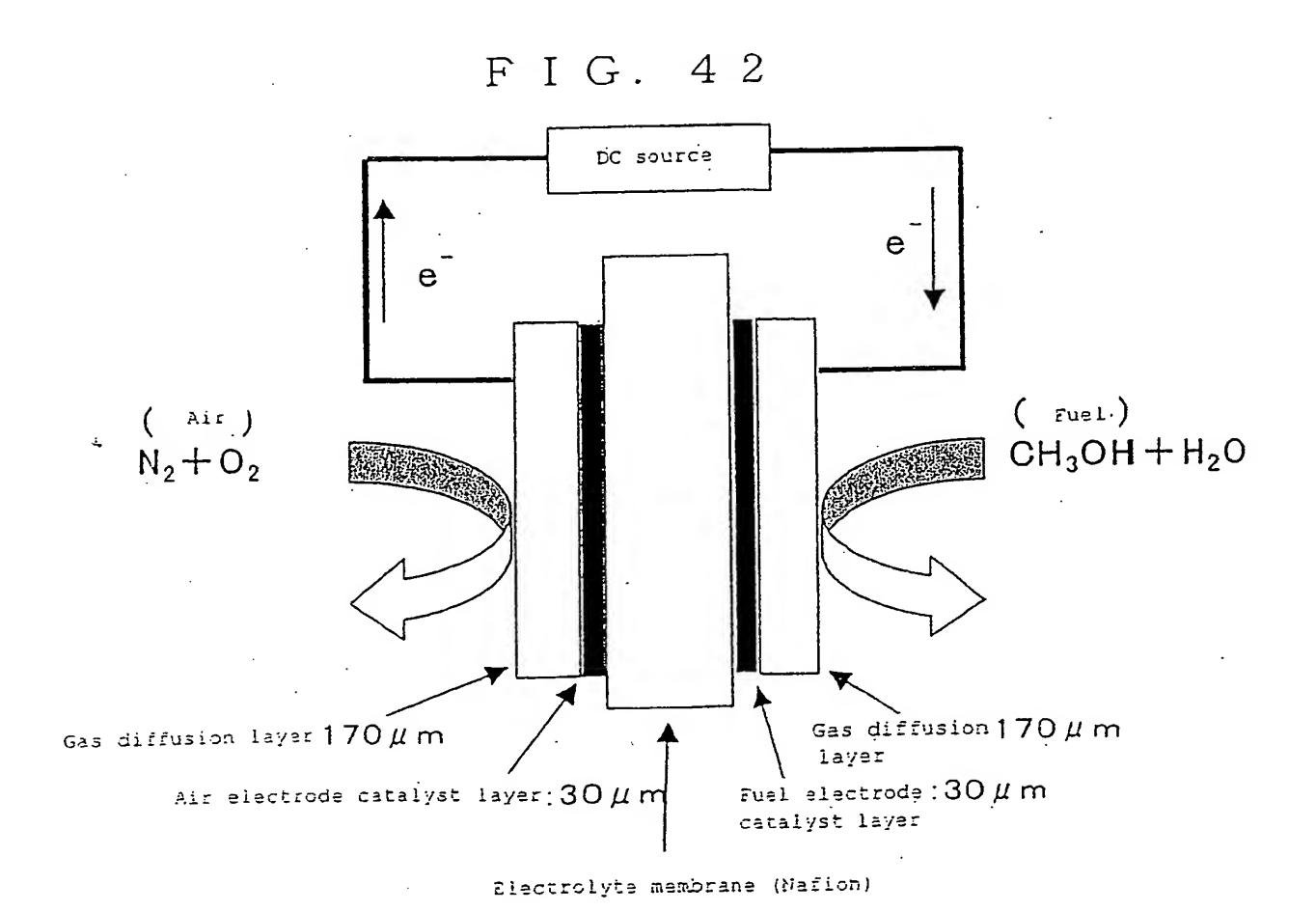


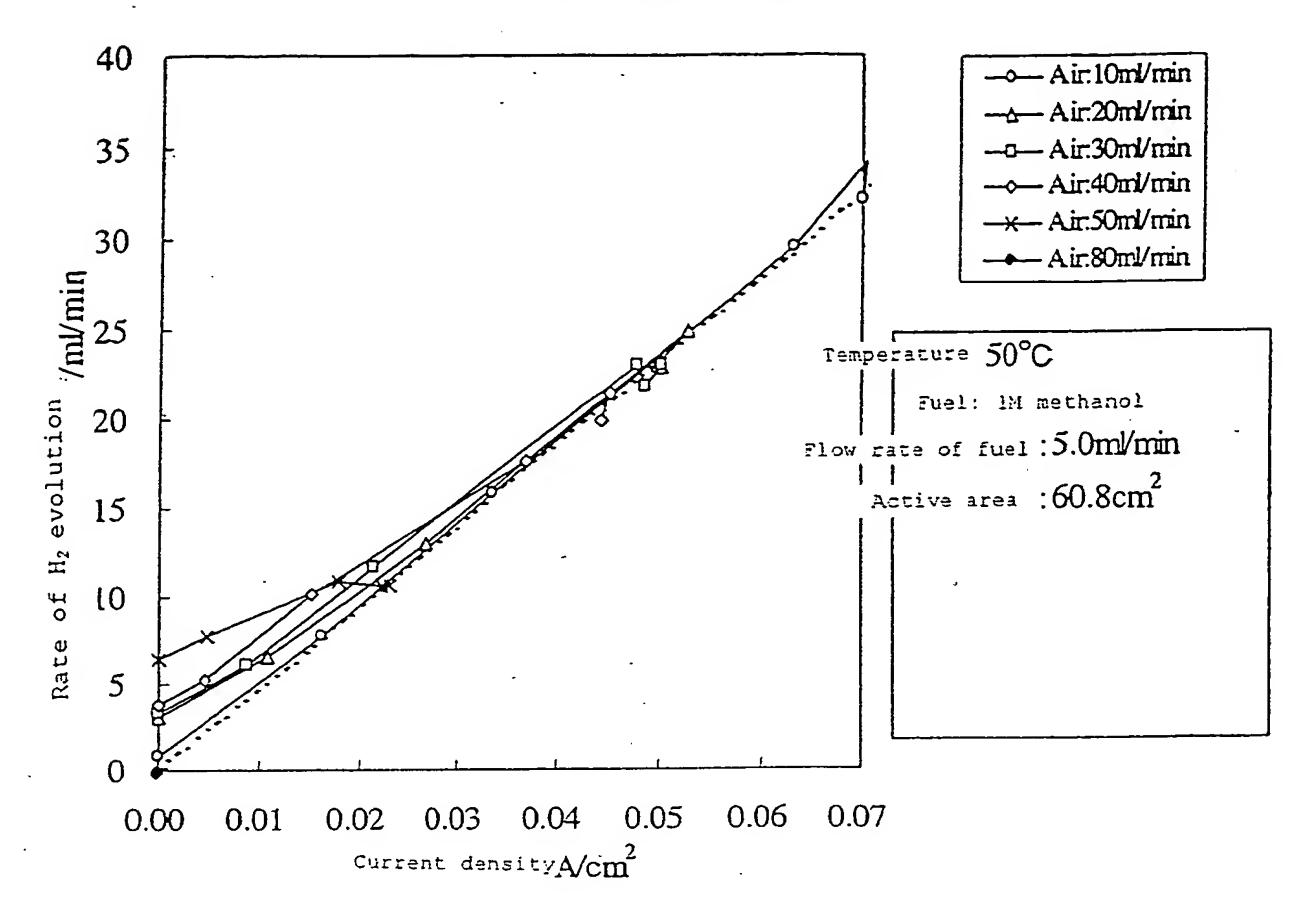
F I G. 40



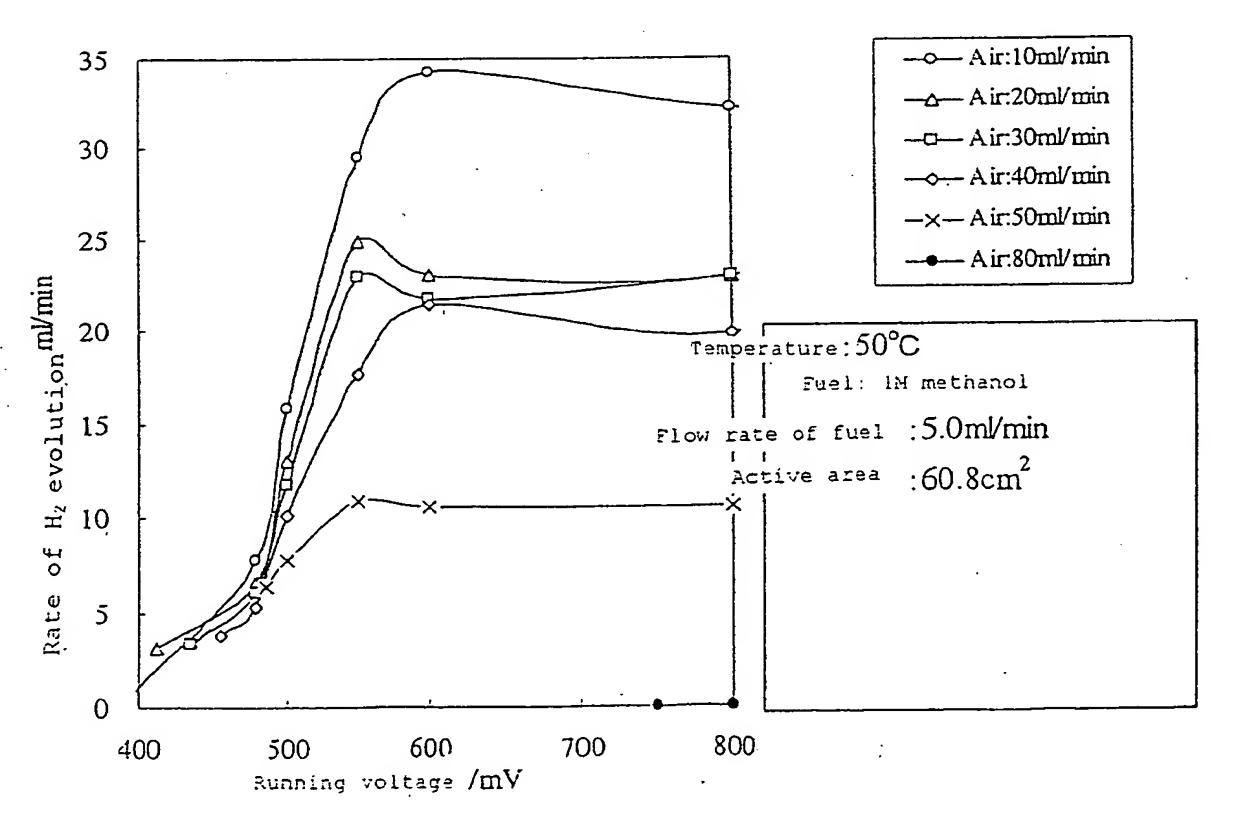
F I G. 41



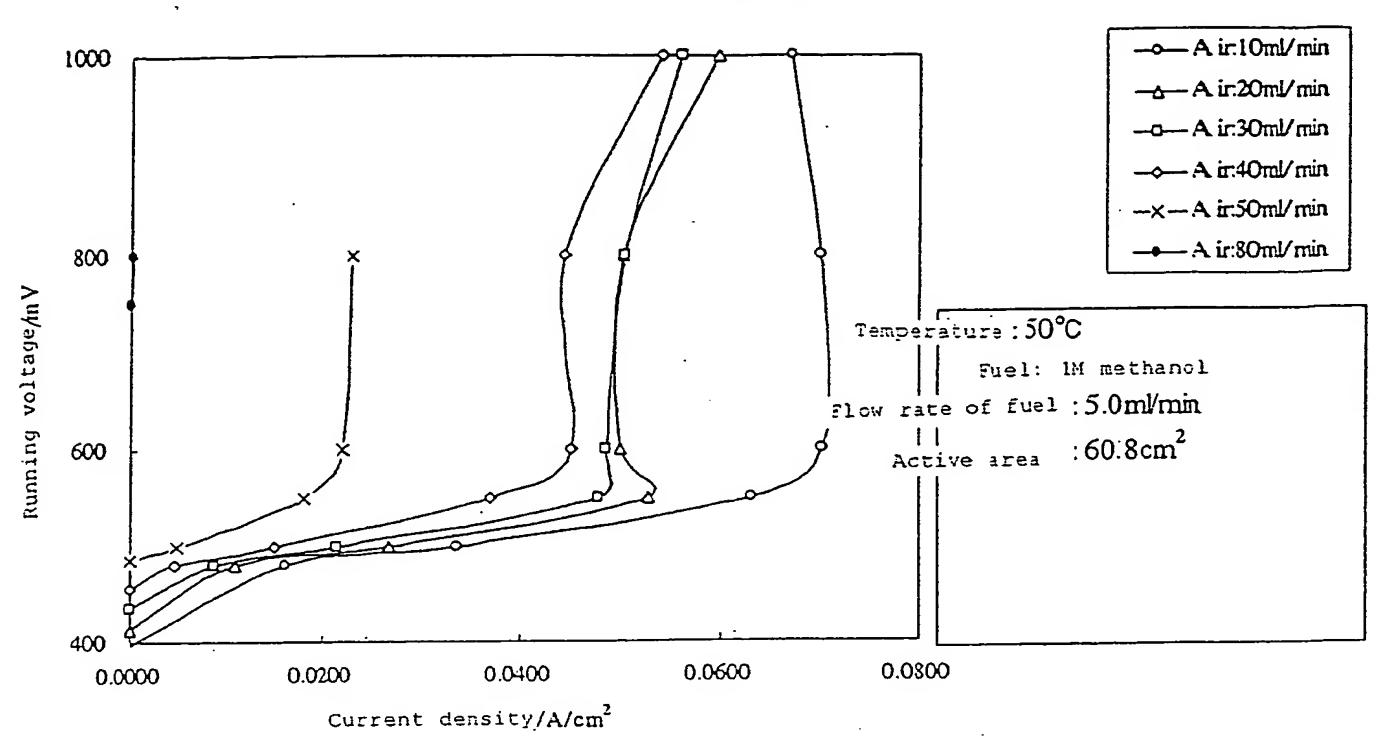




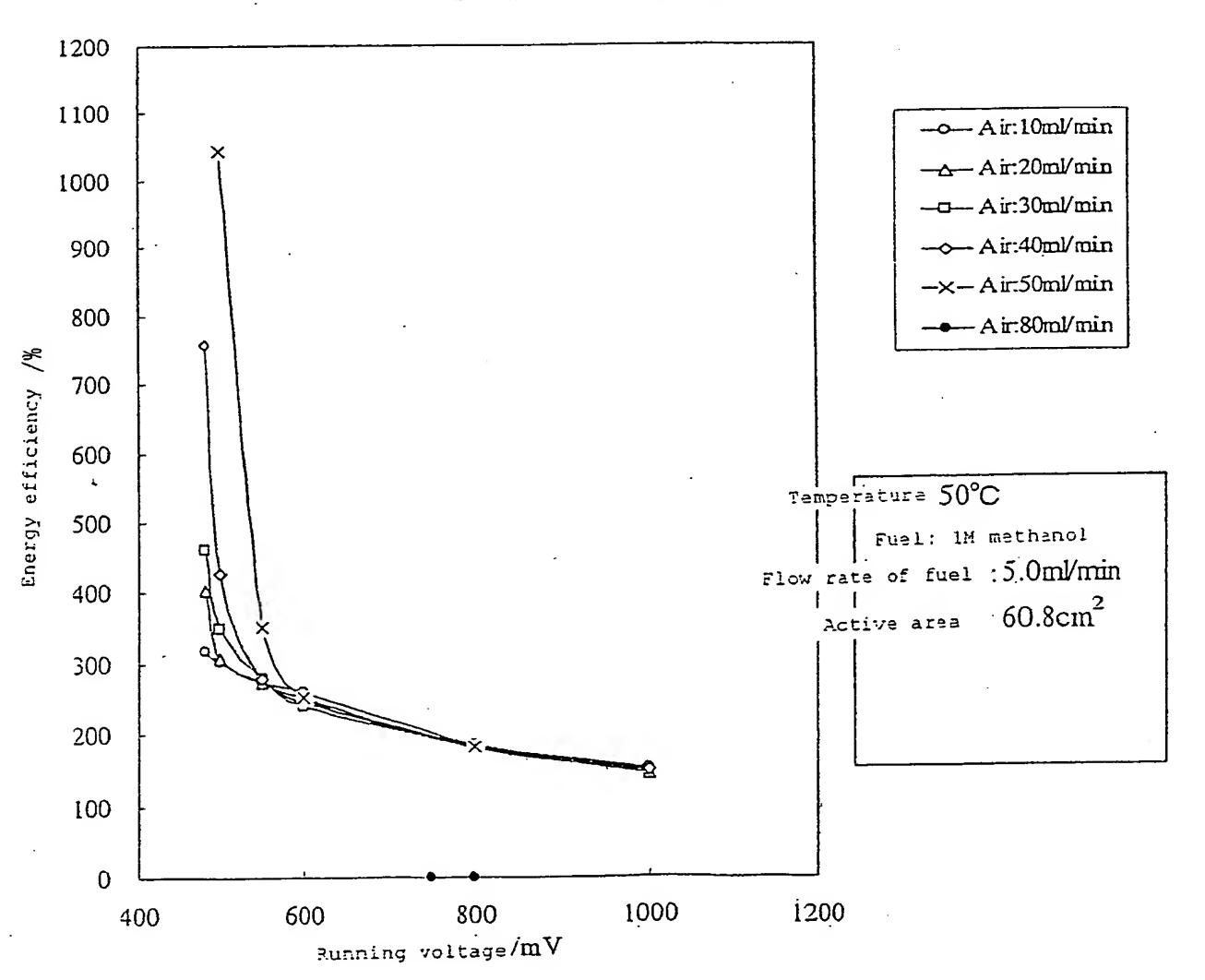
F I G. 44



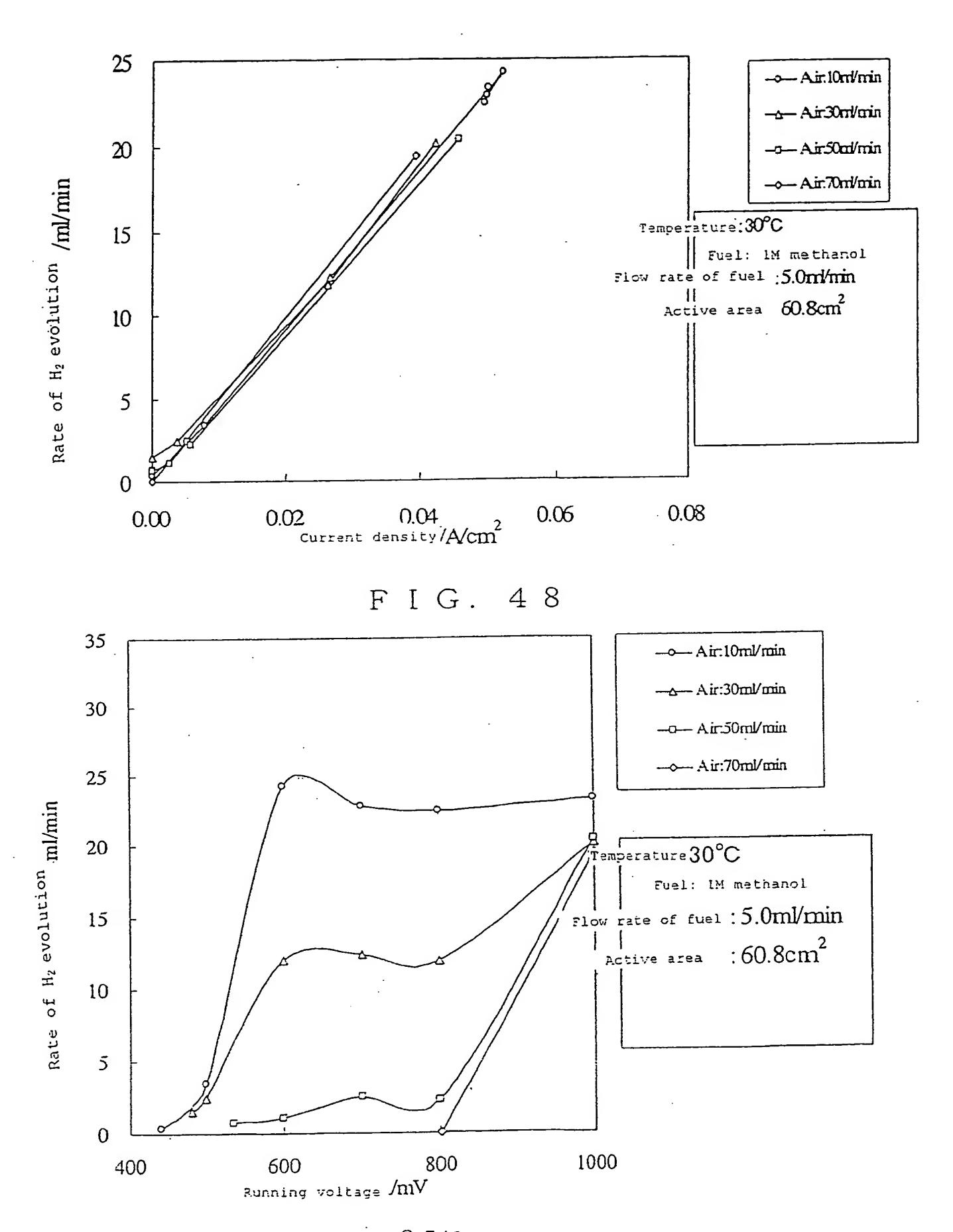
F I G. 45

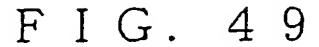


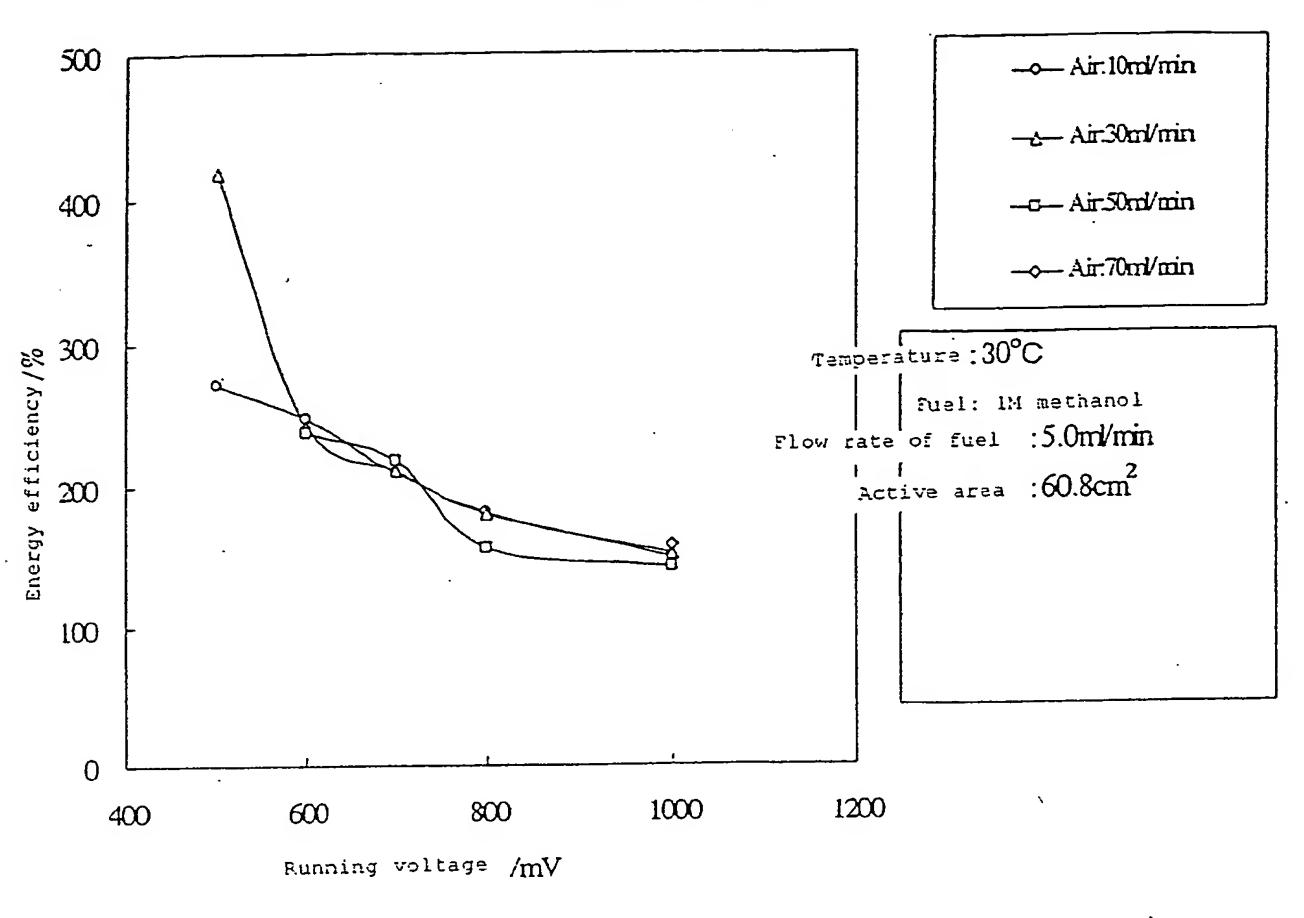
F I G. 46



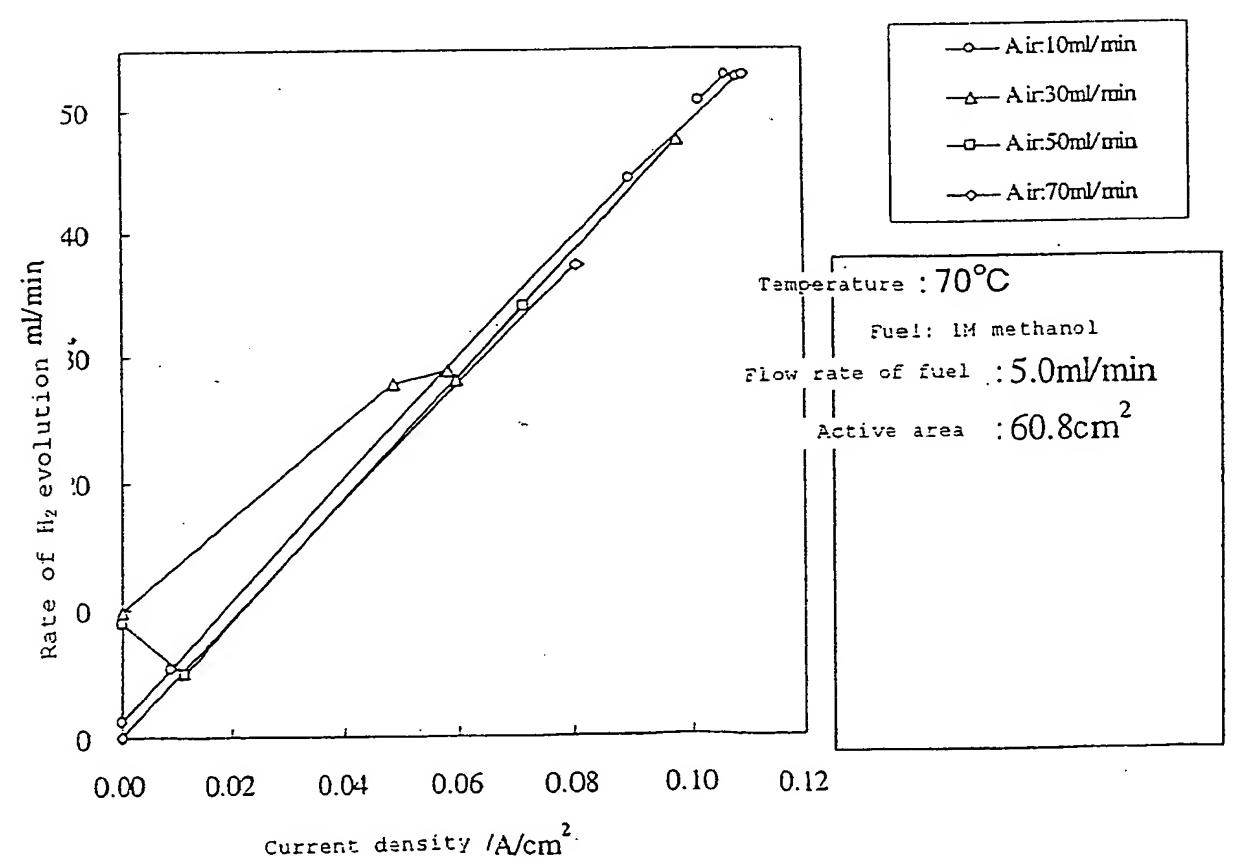
2 4/3 7





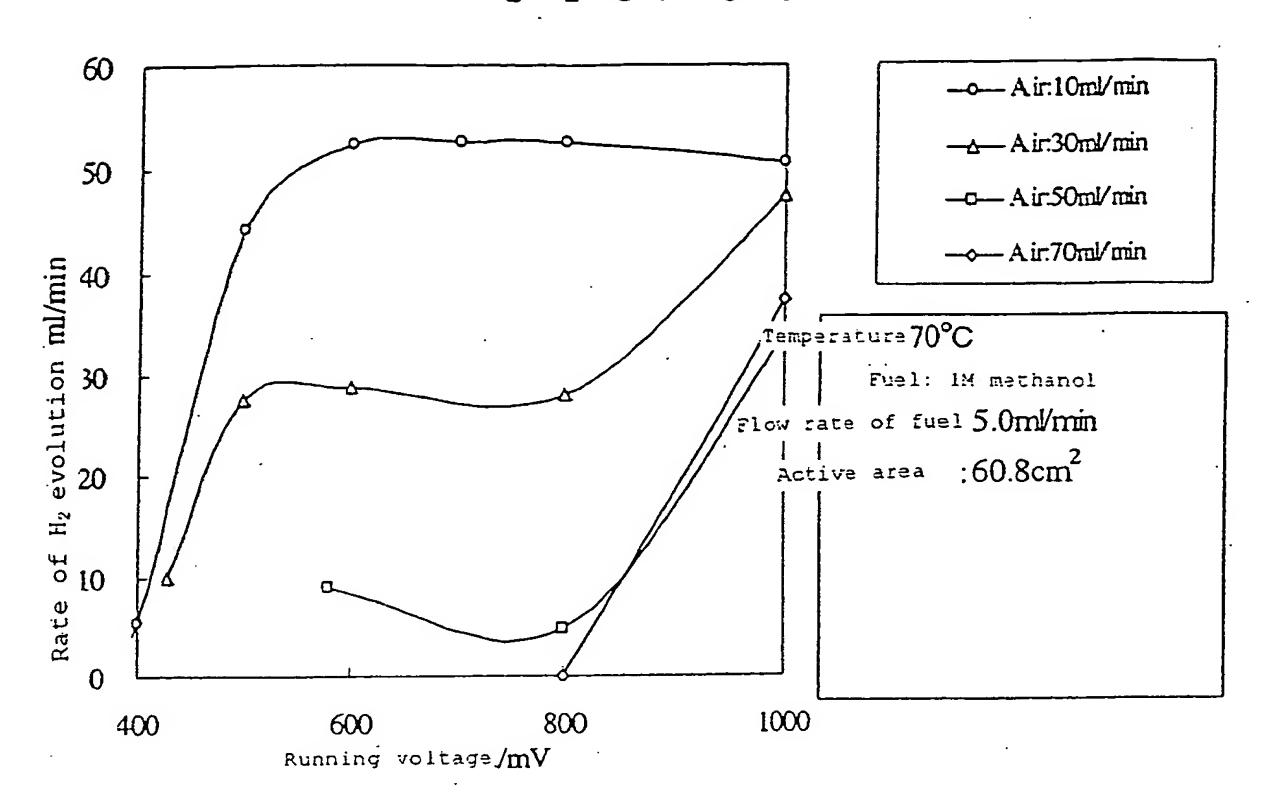


F I G. 50

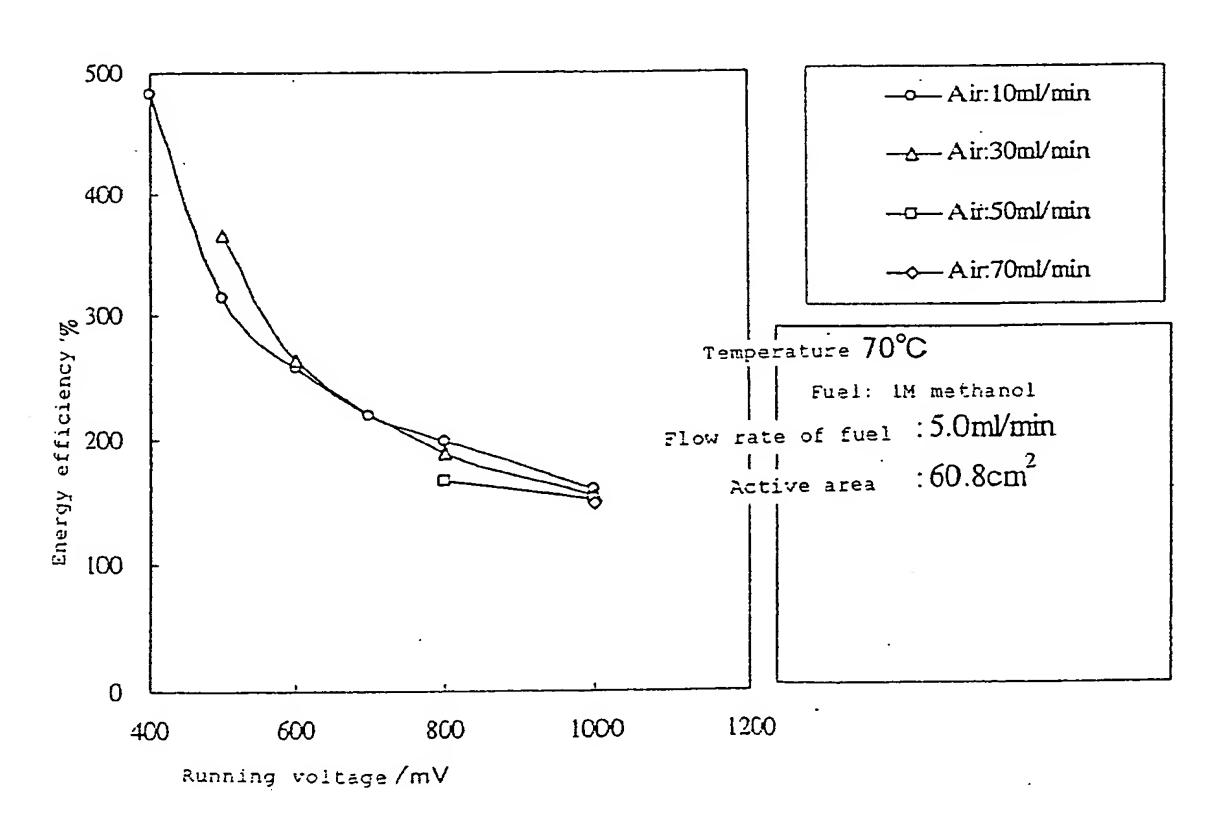


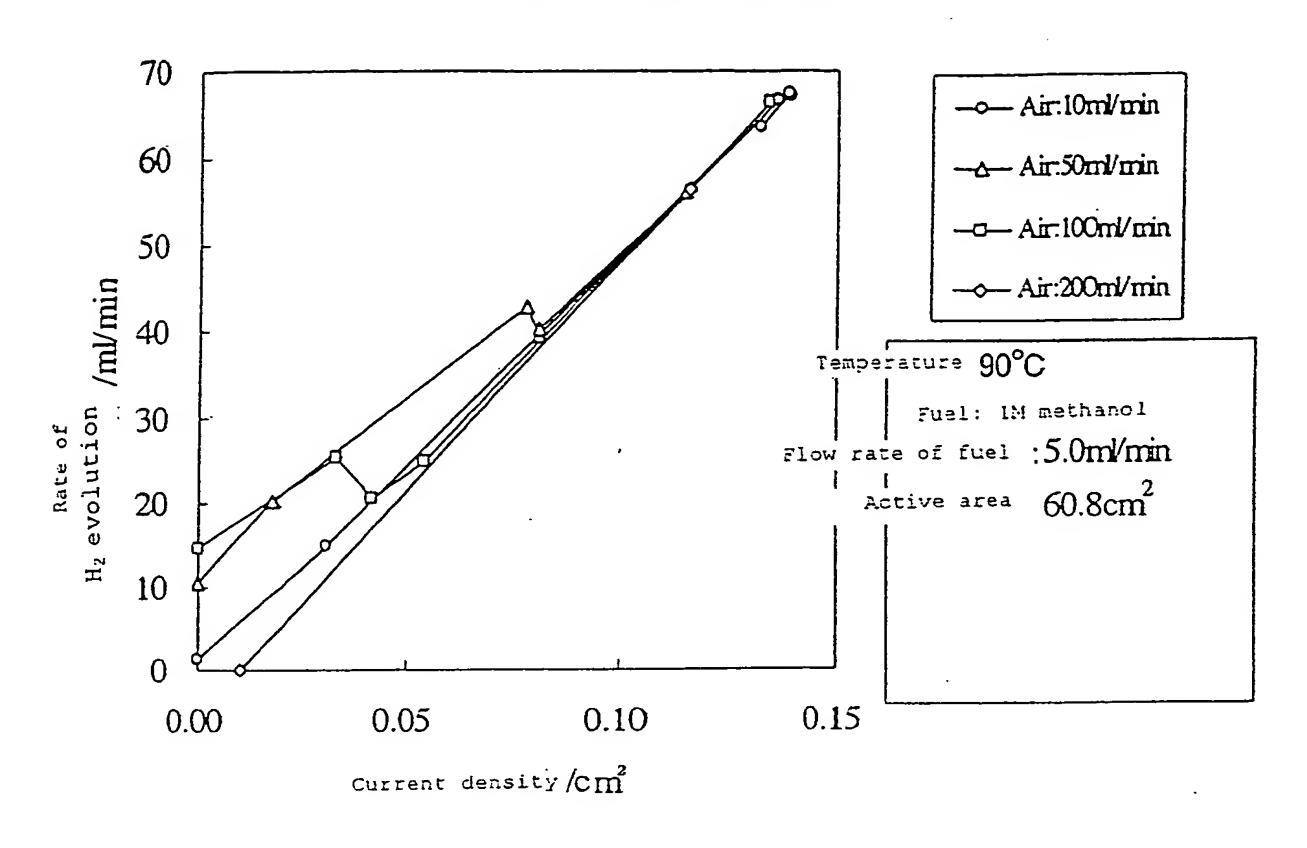
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F I G. 51

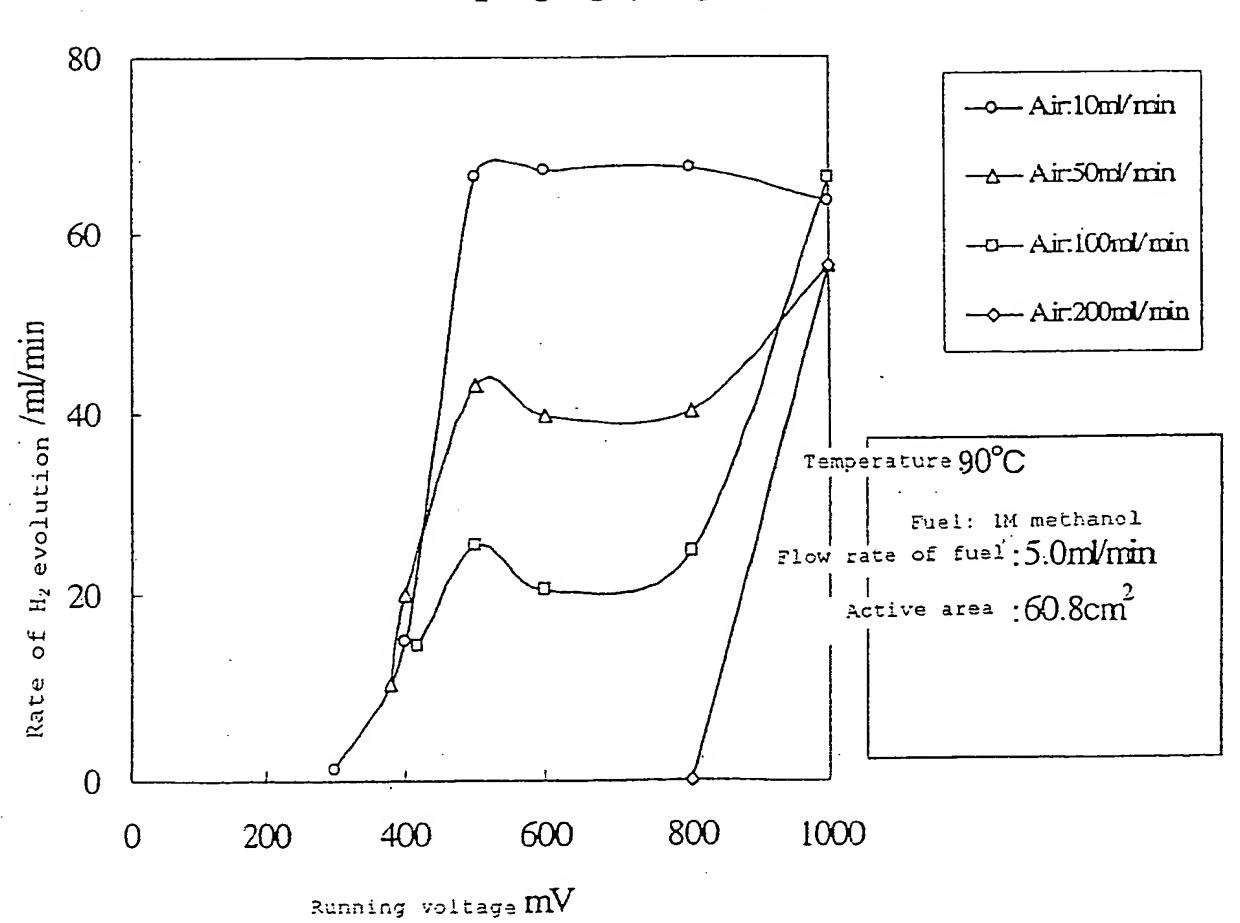


F I G. 52

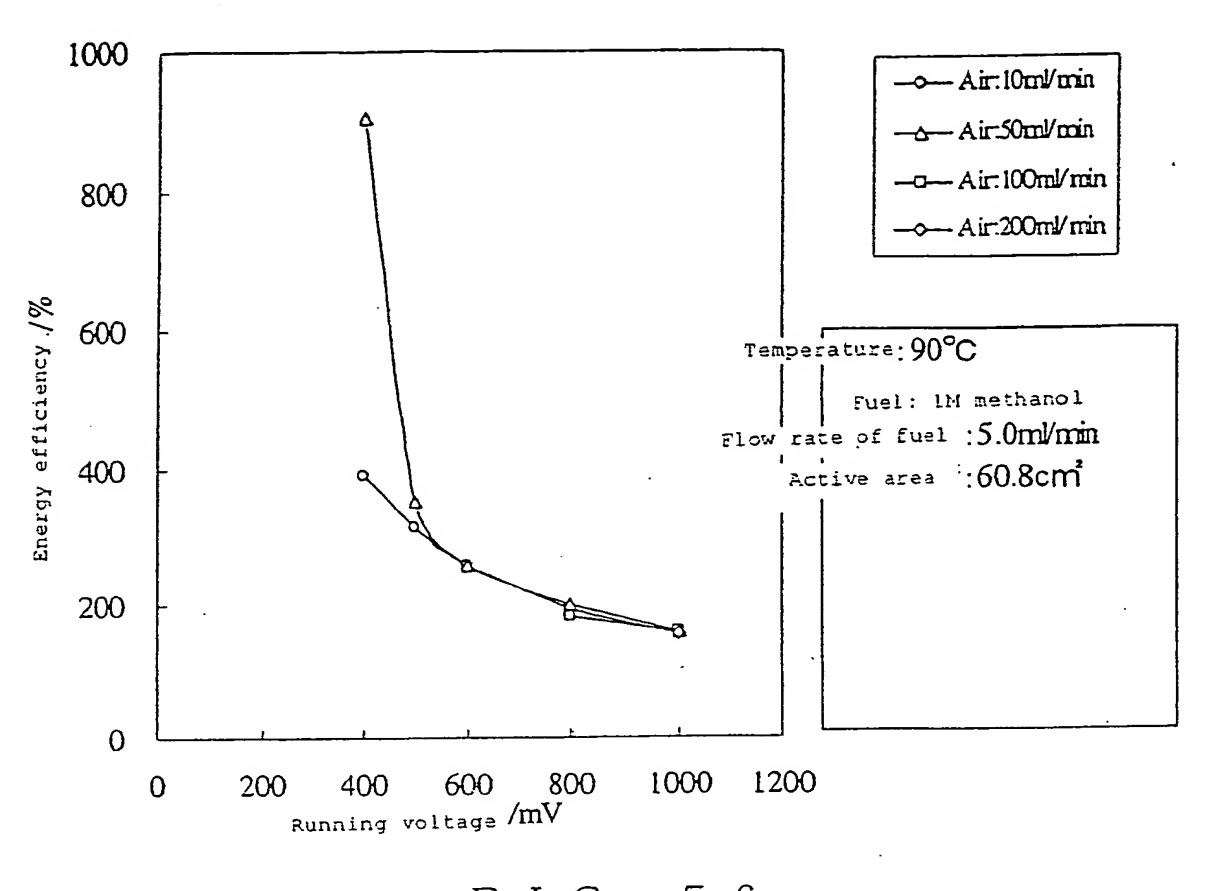




F I G. 54



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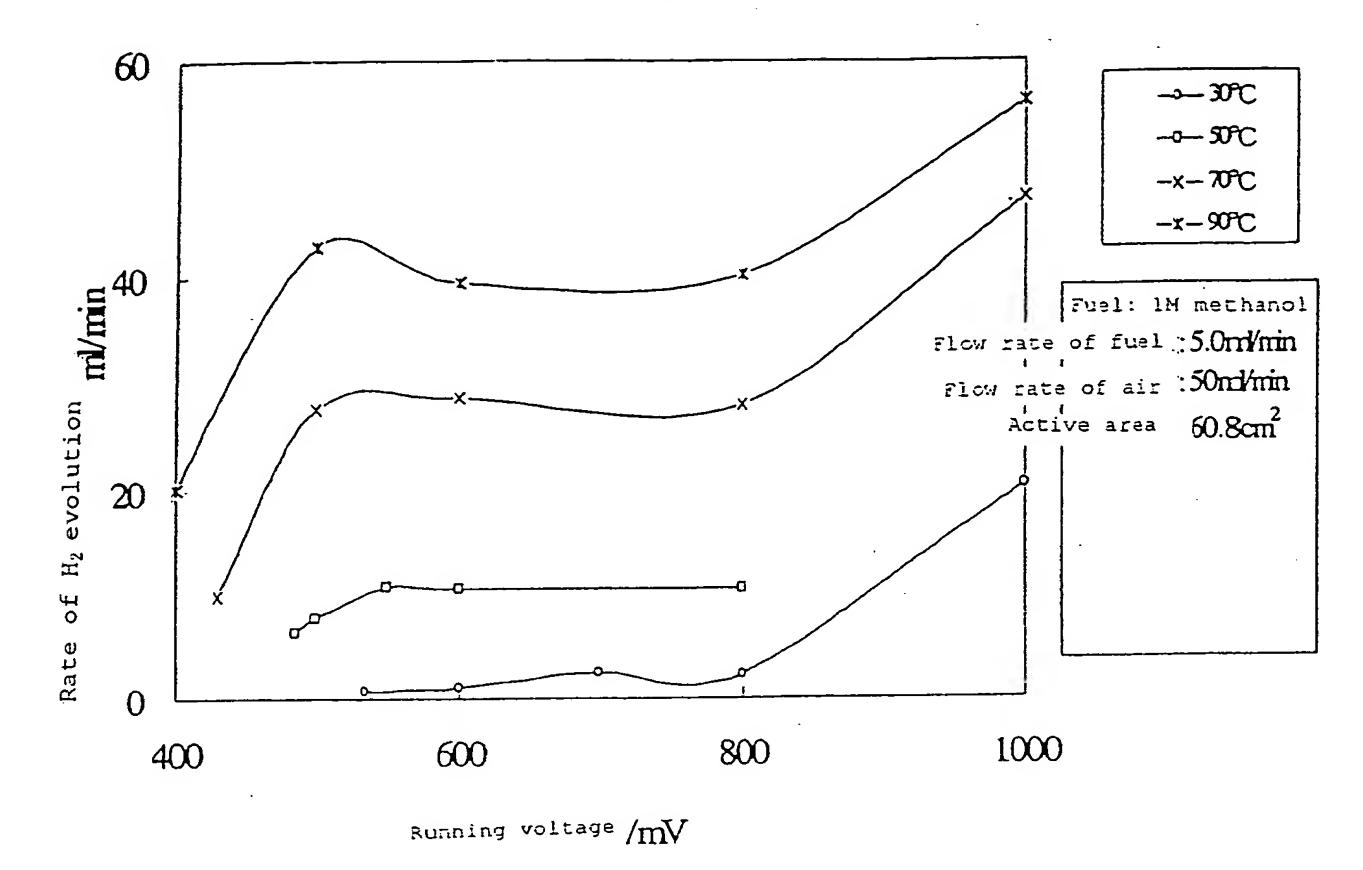


F I G. 56 60 —⊶ 30°C —□— 50°C **50** . <del>-×-</del> 70°C 40 Rate of H2 evolution ml/min Fuel: 1M methanol Flow rate of fuel: 5.0ml/min 30 Flow rate of air:50ml/min :60.8cm<sup>2</sup> Active area 20 10 0 0.06 · 0.08 0.10 0.12 0.00 0.04 0.02

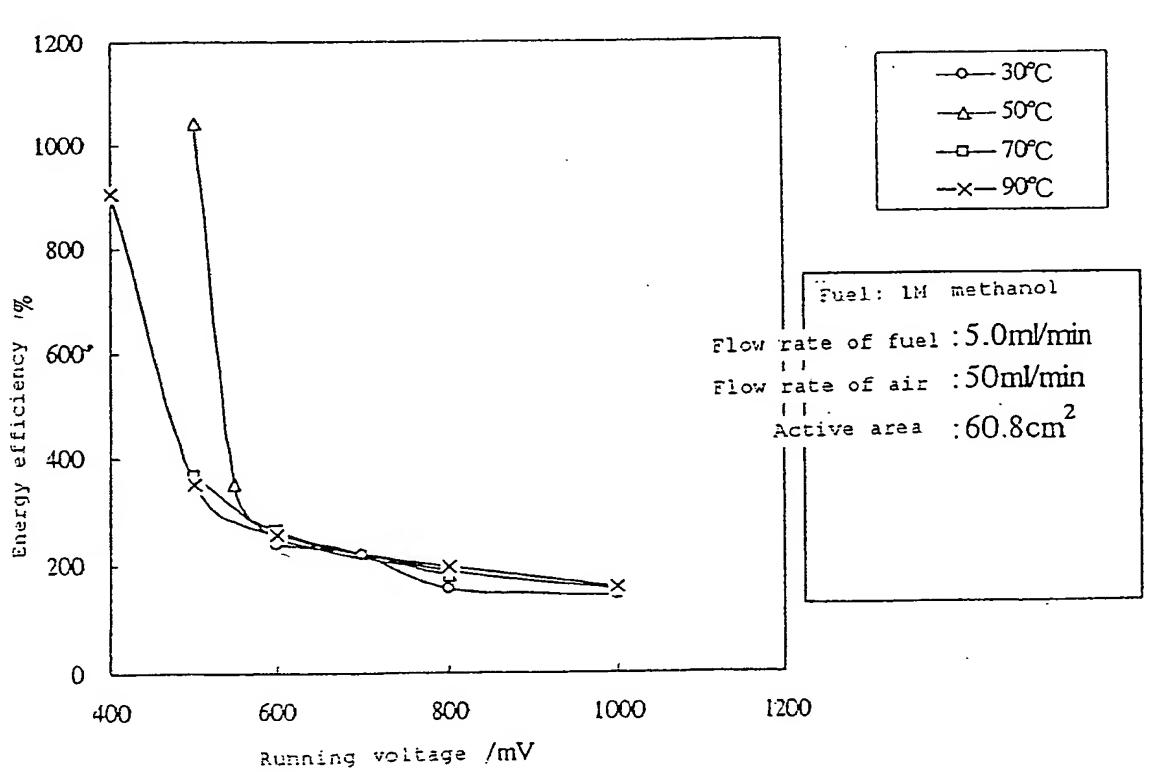
2 9/3 7

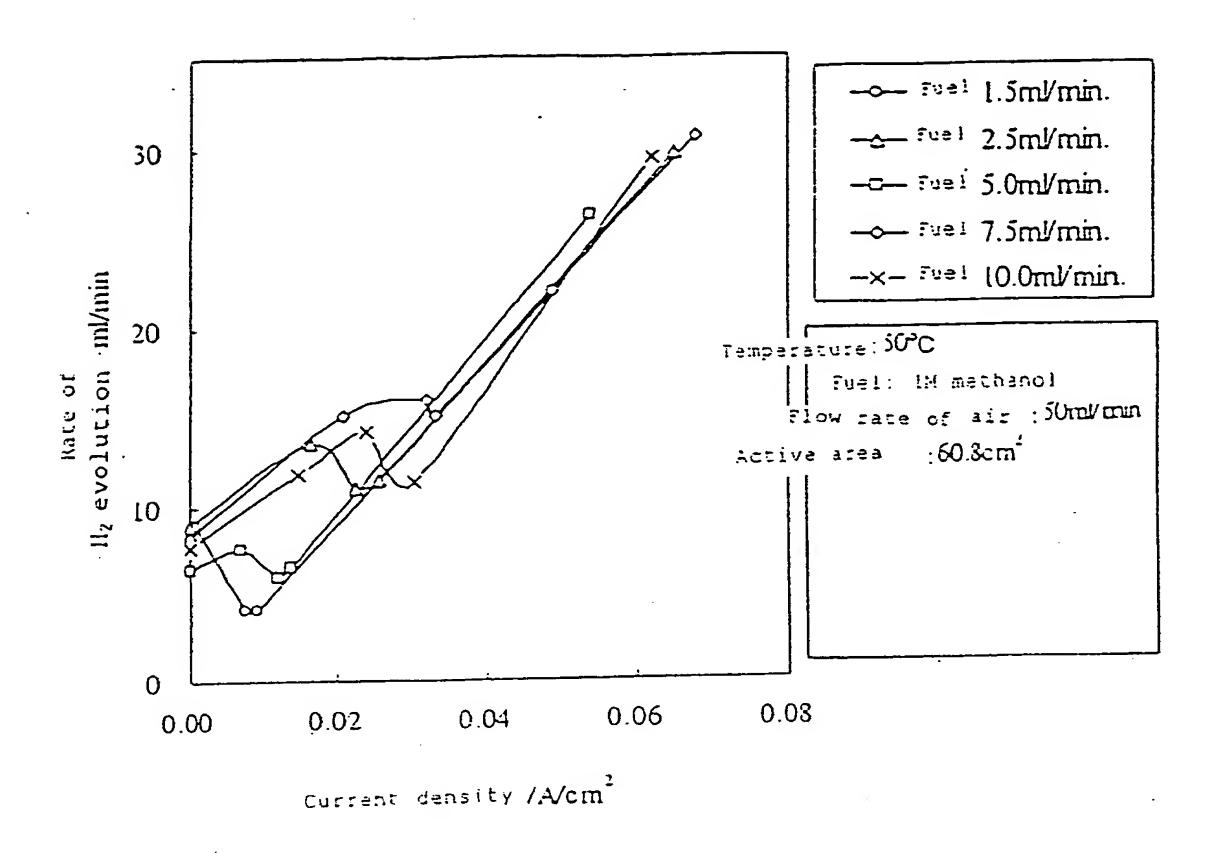
Current density/A/cm<sup>2</sup>

F I G. 57



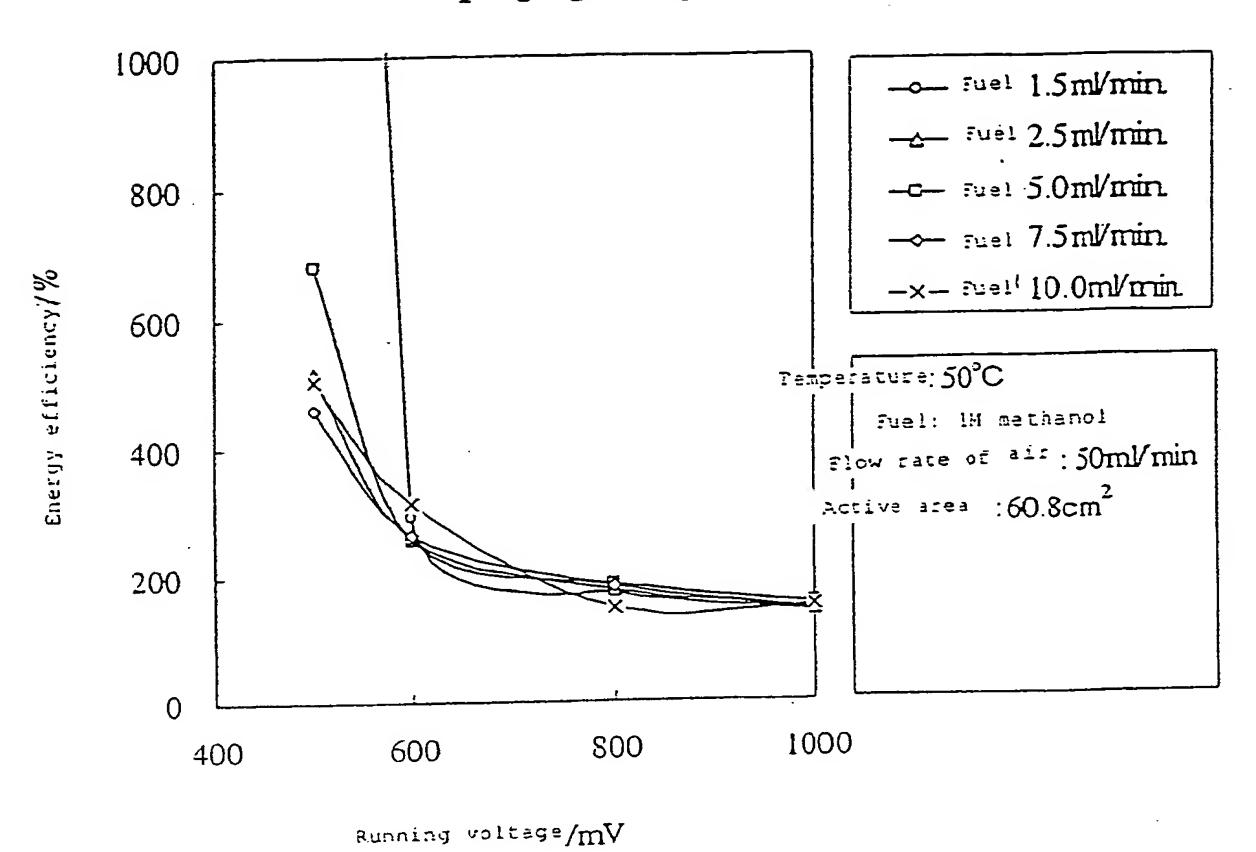
F I G. 58

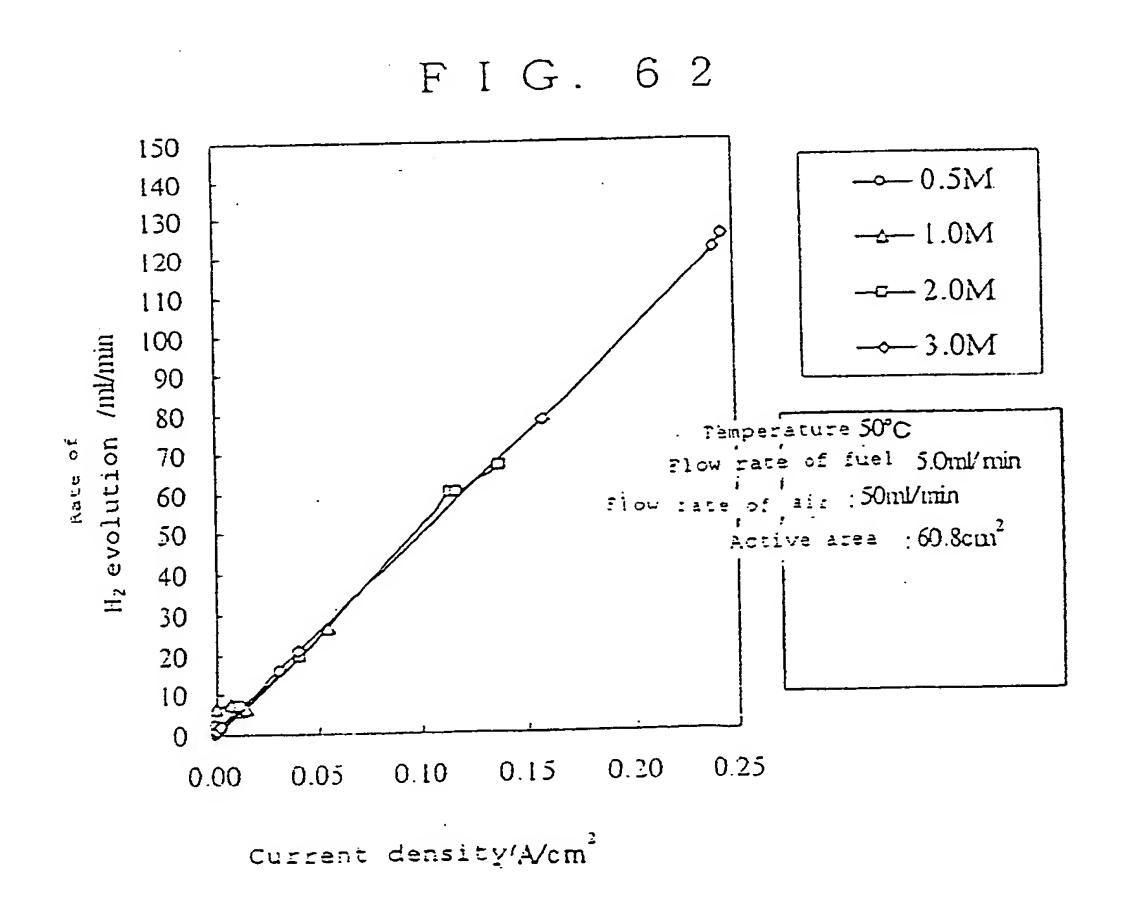


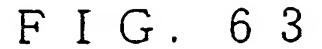


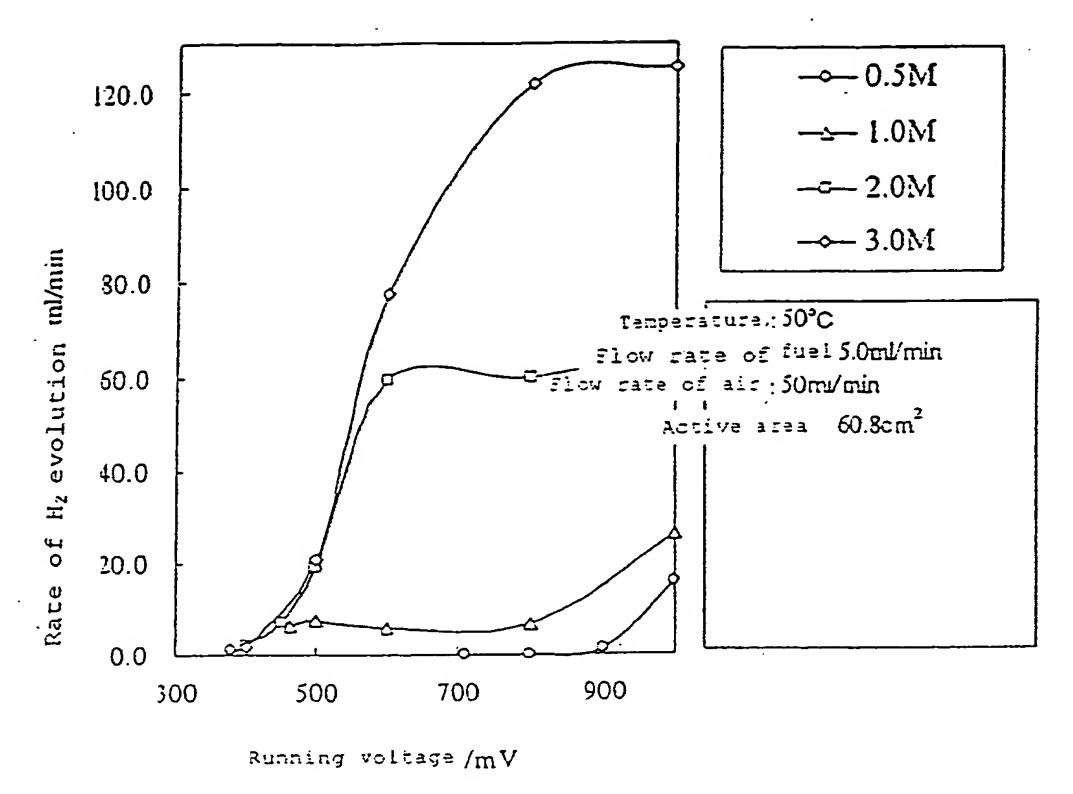
F I G. 60 - Fuel 1.5mVmin - suel 2.5mVmin. 30 o- Fuel 5.0m/min - Fuel 7.5mVmm. -x- Fuel 10.0ml/nin /ml/min Temperature 50°C 20 Fuel. 1M methanol II, evoluțion O flow rate of air:50mVmin Active area :60.8cm<sup>2</sup> 0 1000 SCO 600 4CO Running voltage /mV

F I G. 61

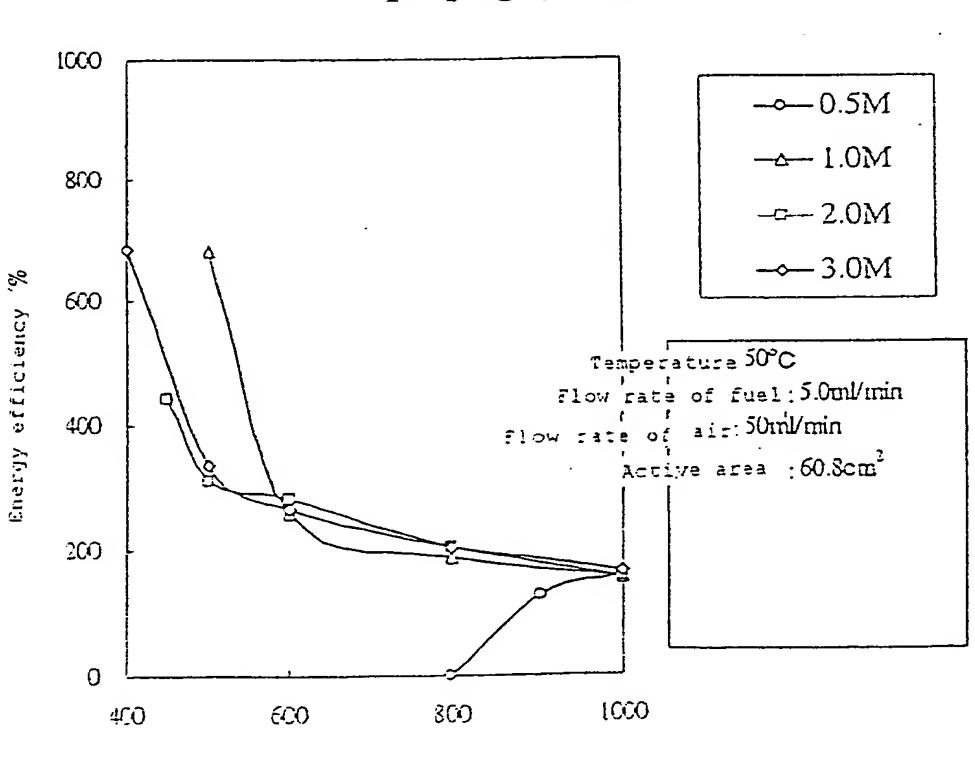








F I G. 64



Funning voltage /mV

F I G. 65

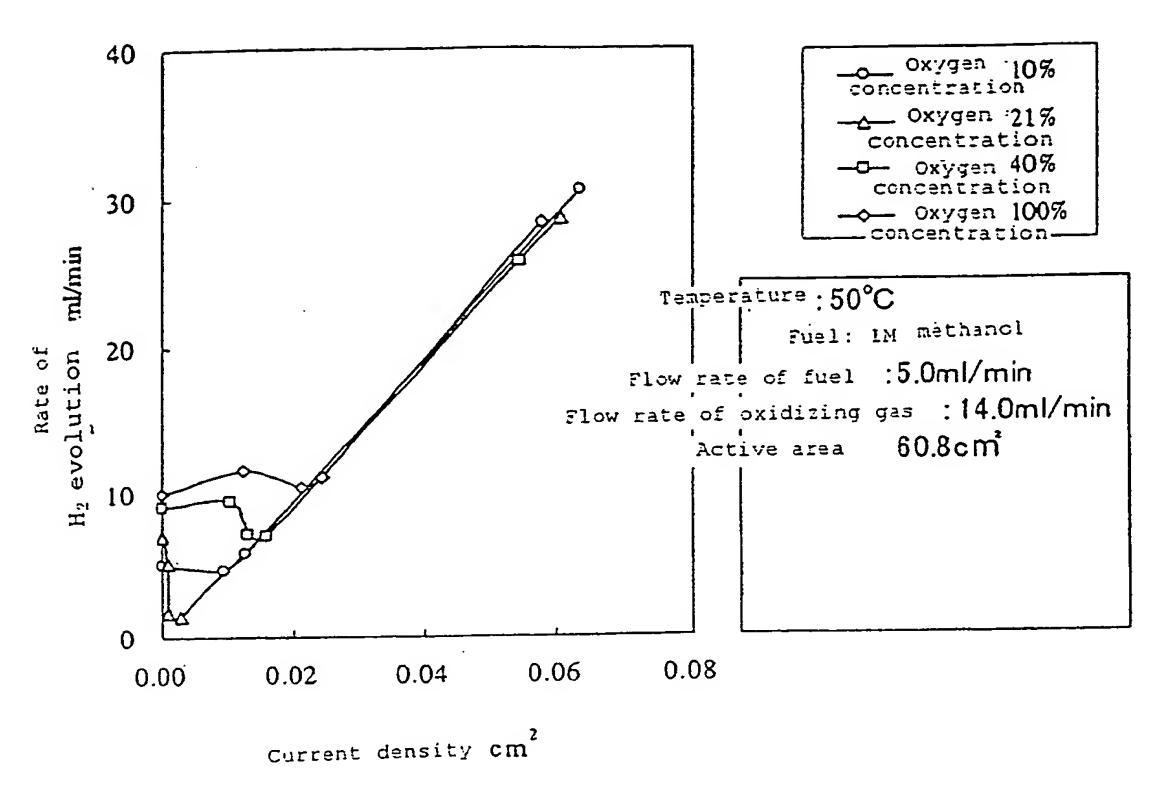
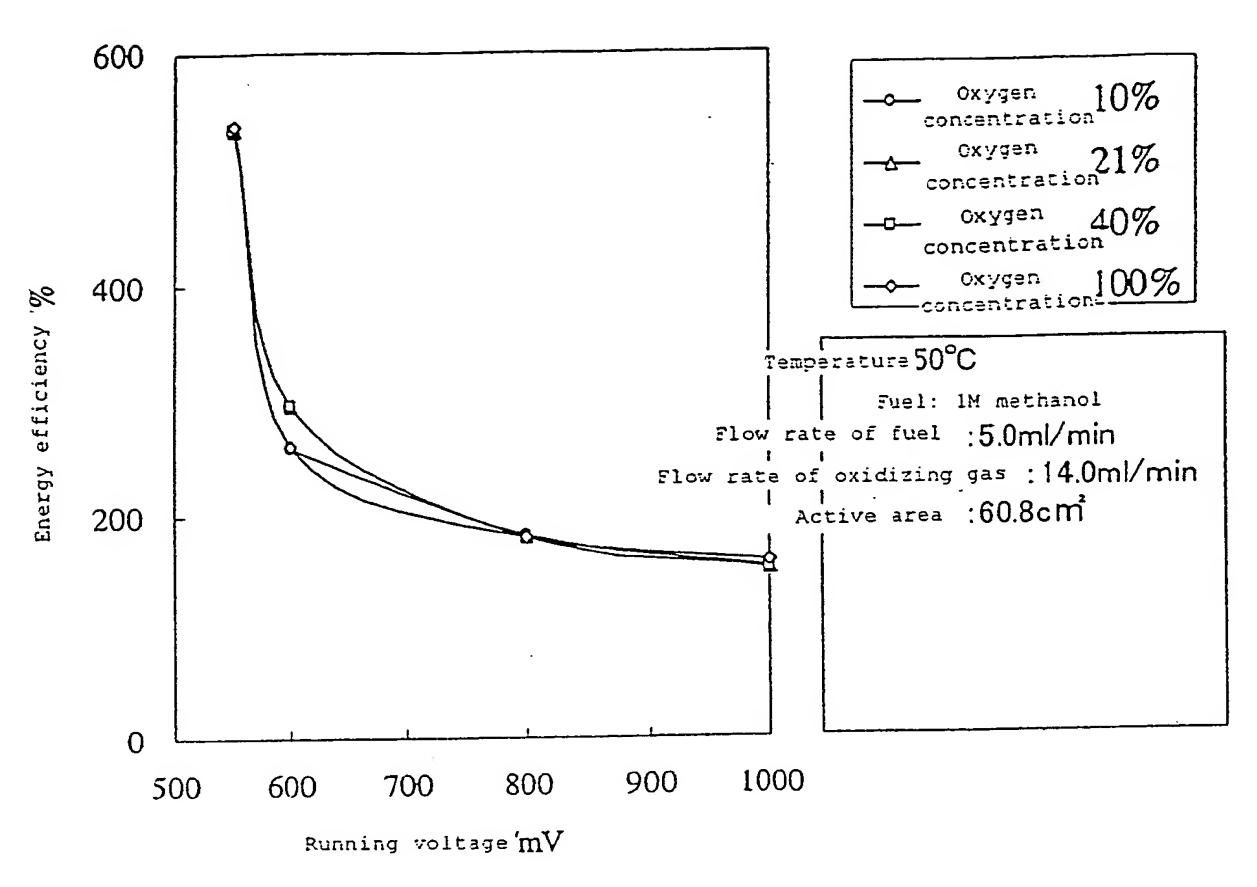


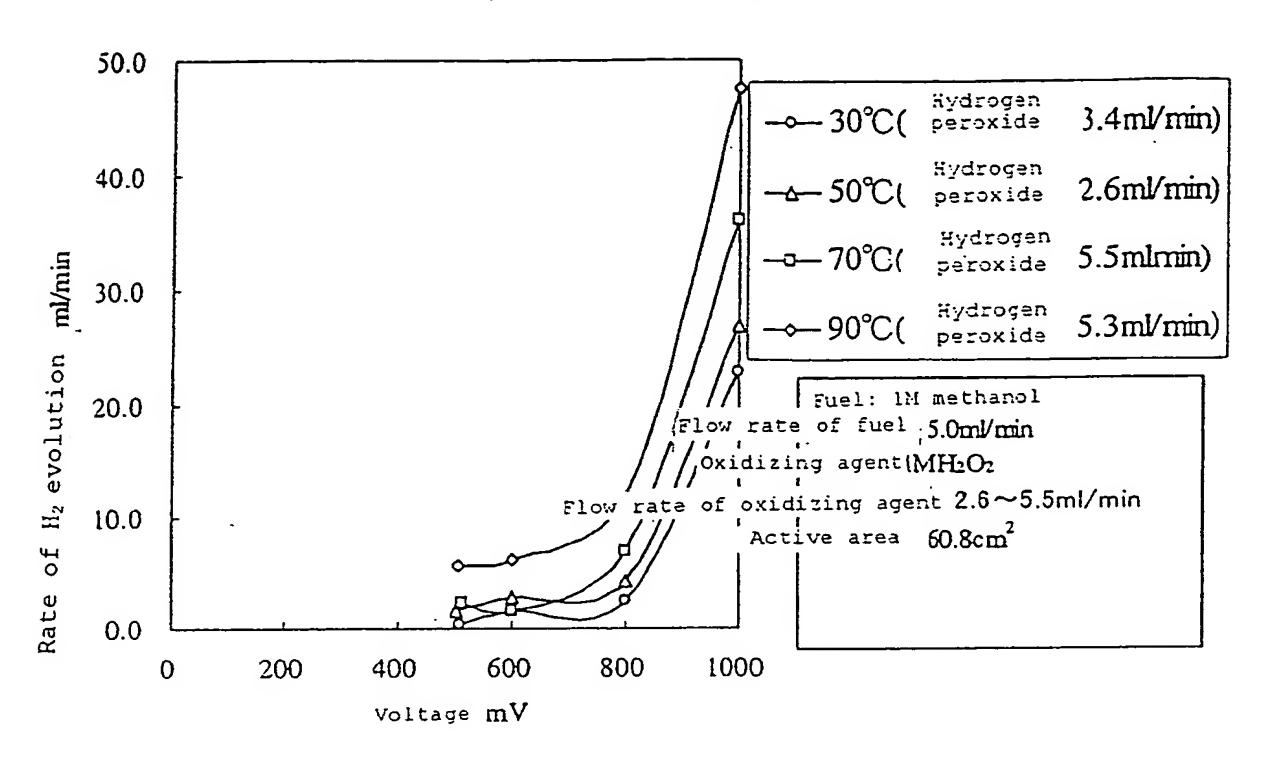
FIG. 66 35.0 Oxygen concentration 30.0 21% Oxygen concentration 40% Oxygen 25.0 concentration. Rate of evolution ml/min Oxygen concentration 20.0 Temperature: 50°C Fuel: 1M methanol 15.0 Flow rate of fuel :5.0ml/min Flow rate of oxidizing gas: 14.0ml/min 10.0 Active area :60.8cm 5.0 0.0 800 1000 600 400 Running voltage/mV

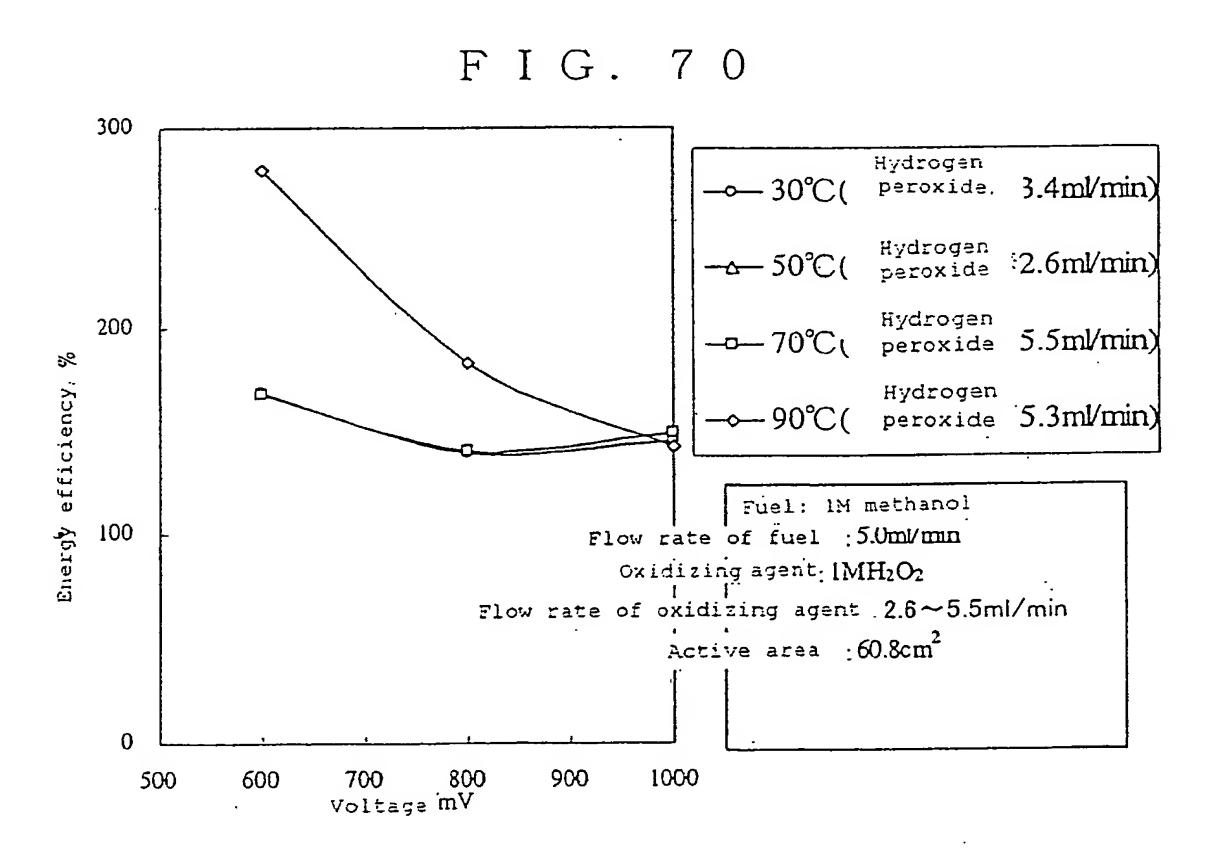
F I G. 67



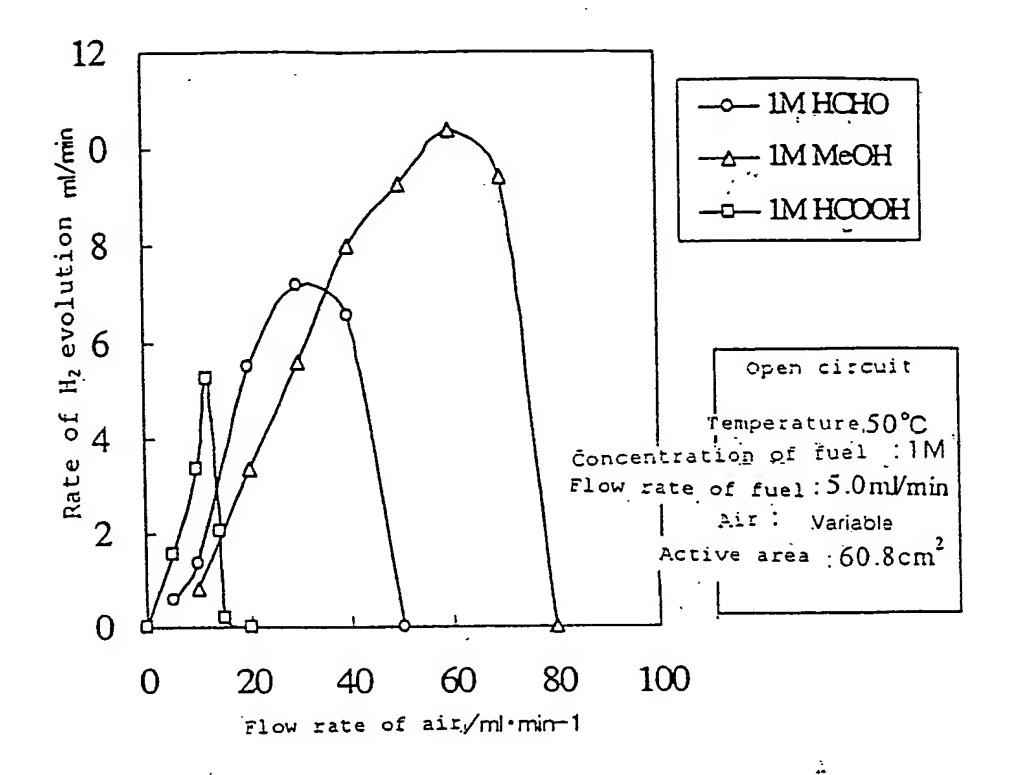
F I G. 68 50.0 -o-30°C ( Hydrogen peroxide 3.4ml/min) Hydrogen peroxide, 2.6m/min) 40.0 Hydrogen peroxide 5.5ml/min)  $H_2$  evolution in/min 30.0 Fuel: 1M methanol. 0.0 Flow rate of fuel :5.0ml/min Oxidizing agent LMHbO2 Flow rate of oxidizing agent  $2.6 \sim 5.5 \text{ml/min}$ Active area 60.8cm<sup>2</sup> of 0.0 Rate 0.0 0.12 0.08 0.10 0.06 0.04 0.00 0.02 Current density A/cm<sup>2</sup>

F I G. 69

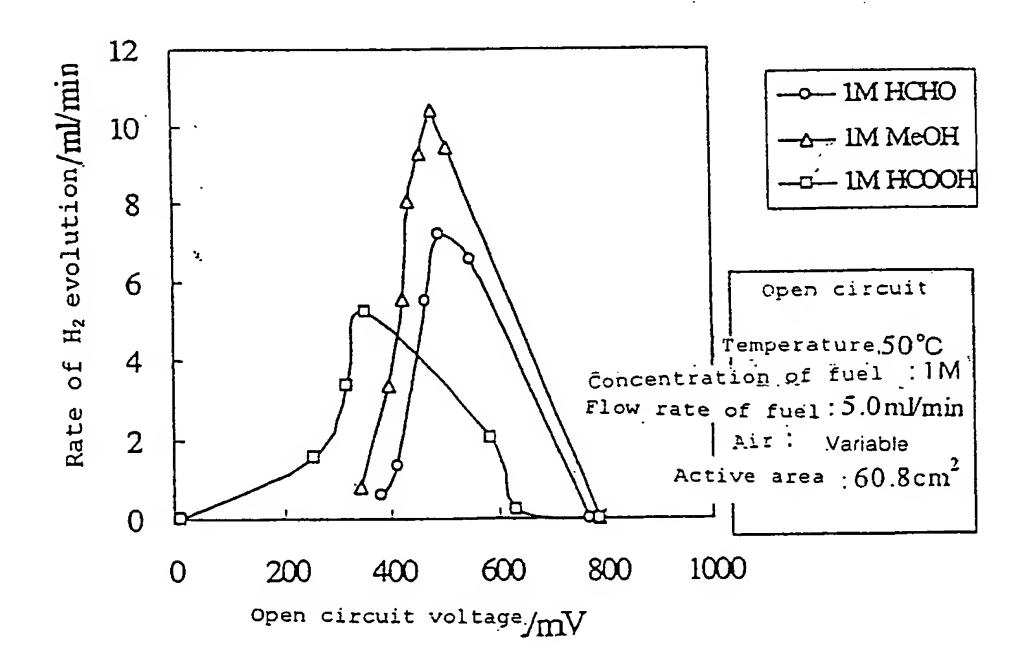




F I G. 7 1



F I G. 72



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